**This is a sample of what is required for week 7. This student received 300/300 for the benchmark assignment.**

**Section 1: Lesson Preparation**

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| **Teacher Candidate Name:** |  |
| **Grade Level:** | **9th** |
| **Date:** | **May 22, 2020** |
| **Unit/Subject:** | **Secondary Mathematics 1** |
| **Instructional Plan Title:** | **Creating One Variable Equations/Inequalities** |
| **Lesson Summary and Focus:** | ***In 2-3 sentences, summarize the lesson, identifying the central focus based on the content and skills you are teaching.***  In this lesson, students will learn to create one variable equations and inequalities to solve realistic problems. We will also cover how to incorporate basic exponential functions into equations/inequalities to solve problems. |
| **Classroom and Student Factors/Grouping: I appreciate the explanation of diverse student levels. I also appreciate that you addressed a wide variety of activities. This site may give you some ideas on grouping diverse populations to alleviate behavioral issues** [**https://www.teachthought.com/pedagogy/use-flexible-grouping-classroom/**](https://www.teachthought.com/pedagogy/use-flexible-grouping-classroom/) | Student factors include students with ELL, IEP, 504, and gifted classifications. ELL students will have directions written in their native language and be provided cultural context explanations; students with special needs will be offered assignments with varied levels of difficulty, access to textbook using technology (including videos of lessons and capability to reread directions aloud), and virtual/physical manipulatives; independent study will be available to gifted students as well as challenging activities on assignments; and there will be a wide variety of activities to eliminate down time and reduce boredom for students with behavioral concerns. |
| **National/State Learning Standards:** | Standard A.CED.1  Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and simple exponential functions (Utah Education Network, n.d.). |
| **Specific Learning Target(s)/Objectives: Your chosen standard is accurate and perfect for the lesson plan. I love your measurable objective, therefore performance-driven.** | Students will be able to correctly solve five out of six word problems on summative test by creating one variable equations/inequalities, using both linear and exponential functions. |
| **Academic Language I can always count on you to pay attention and follow directions. Showing both vocabulary and academic language is very well done.** | ***In this section, include a bulleted list of the general academic vocabulary and content-specific vocabulary you need to teach. In a few sentences, describe how you will teach students those terms in the lesson.***  Content Vocabulary:   * Linear * Exponential * Hypothesis   Academic Vocabulary:   * Coincide * Derive   Before beginning representations section, we will review the meaning of each of the content vocabulary terms. Because “linear” should be a term that students are already familiar with, review of its meaning will be brief. I will pronounce each term and then ask the class for ideas of what it means. After their input, I will give the correct meaning and an example of its use in mathematics. The terms will be displayed on the whiteboard with a brief description of their meaning and an example of their use.  The academic vocabulary words I will use while presenting the content to students, while giving a simpler explanation of their meaning right afterward. (For example, “The variable in an equation coincides with, or represents, the value of an object,” or, “The values in the equation we derive, or take, from the values listed in the word problem.”). Content and academic vocabulary terms will continue to be used casually during the rest of the lesson to familiarize students with their use. |
| **Resources, Materials, Equipment, and Technology: Good job coming up with a list of materials for students. I also appreciate that you included your website. I am just not sure if the video is appropriate for your population.** | ***List all resources, materials, equipment, and technology you and the students will use during the lesson. As required by your instructor, add or attach copies of ALL printed and online materials at the end of this template. Include links needed for online resources.***   * Shark Tank video at: https://www.youtube.com/watch?   v=hfGa4HeVrGc   * Tablets with textbook access, video of lessons, and practice problems * 8 Posters describing scenarios from Mathalicious * Hat/bowl with numbers from 1-8 (4 of each) * Burger King Hypothesis Worksheet * Exit Tickets * Homework Handout |

**Section 2: Instructional Planning**

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| **Anticipatory Set I can better understand your direction. The anticipatory set should be a review and a hook of what will be covered in this lesson which you have done very well.**  Class will watch a portion of a **Shark Tank episode** and determine whether it is a wise investment (video plays from 0:00-1:52, 3:39-4:14, 5:55-6:31, 6:36-7:54). Instruct students to take notes as if they were the judges and were seriously considering the business deal. After each segment, we will discuss what played in the video very briefly (a minute or less):  0:00-1:52 Introduction to the proposition.  3:39-4:14 Additional information for the product. Emphasize the costs and profit estimates given and how they relate to proportions (which students would have had learned about previously).  5:55-6:31 Contestant’s pitch and business proposition. How good is his business pitch?  6:36-7:54 Information about the rights to the recipe that might make this a bad business transaction. How does this change how you view the proposal?  After the video, we will have a short discussion on their view of the proposition and the ways that they could analyze its effectiveness. Ask students to describe their methods for analyzing the proposition. After this, then pose the question, “How can we analyze the situation easier?”, tying it into how creating equations to represent information in problems can make the problem easier to analyze. | **Time Needed**  **10 minutes** |
| **Multiple Means of Representation Using a Venn diagram is an excellent idea to break down a word problem. If I were a substitute, I would be able to easily follow.**  **I am very impressed with the thoughtful inclusion of your special populations.**  I will briefly explain how to set up one variable equations/inequalities from the information in a word problem. I will explain the difference between creating equalities, inequalities, and exponential functions. Students will follow along with the explanation with **corresponding information on tablets**. **Manipulatives and visuals** will be used on whiteboard. After each part (equations, inequalities, exponential function) students will complete a few short practice problems **on tablets.**  Students will spend rest of time (approximately 15 minutes) in problem-based learning. Students will work in their regular groups to solve three word problems-one each for equalities, inequalities, and exponents. Problems will be written or projected on the board.  *Explain how you will differentiate materials for each of the following groups:*   * English language learners (ELL):   Directions for practice problems will be in native language.   * Students with special needs:   Video of lesson will be available on tablet to be played back later if needed.   * Students with gifted abilities:   Can use independent study in lieu of lesson (if tested out)   * Early finishers (those students who finish early and may need additional resources/support):   Spend any remaining class time on independent study or compacted curriculum. | **Time Needed**  **30 minutes** |
| **Multiple Means of Engagement**  **The card activity and teacher modeling will work very well. Then bringing in the Burger King concept will totally drive home the equation/inequalities solutions.**  **I may even understand math equations better LOL!!**  Several areas will be set up around the classroom, each with a poster explaining a different **scenario created through Mathalicious** that requires the use of creating one variable equations/inequalities. Students will draw numbers from a hat/bowl that correspond to each numbered poster and join that number group. One student in each group will pull up the Mathalicious scenario on their tablet and lead the discussion. Students will discuss and solve the problems on the poster. If groups finish early, they can rotate to other posters and give input to the other groups.  Introduce the **Burger King Hypothesis Activity**: Students are put in the shoes of a manager at Burger King who must decide what arrangement of employees at which station would be the most effective. Hand out the worksheet for this activity. Students in their regular groups are given tables of four different employee’s average work times at each of four different stations. Groups must make a hypothesis of the effectiveness of least 3-4 different scenarios/combinations of employees/stations using equations/inequalities and test their hypotheses before agreeing on the most productive solution. Groups will work on this activity for the next few lessons and offer their most effective solution to the class at the end of last lesson.  As groups work, I will pose questions to each group to assess their understanding and progress in creating their hypotheses.  To further engage with and practice the content, students will have access to practice problems and the textbook through LMS based software to use during class or at home.  During last 5 minutes of this section, we will do practice questioning as a whole class, using these increasing levels of higher order questions:   1. What is a variable and what does it represent? 2. How do you solve an equation/inequality? 3. Why does setting up a word problem as an equation/inequality make it easier to solve? 4. What would happen if a problem required two variables?   *Explain how you will differentiate activities for each of the following groups:*   * English language learners (ELL):     Explanation of the cultural context to scenarios will be given.   * Students with special needs:   Directions can be read aloud on tablets for Mathalicious scenarios.   * Students with gifted abilities:   A challenge to come up with an alternate view of the scenario than that which is presented and discuss it with their group will be written on whiteboard as an option.   * Early finishers (those students who finish early and may need additional resources/support):   Start on Burger King Hypothesis Activity Worksheet | **Time Needed**  **20 minutes** |
| **Multiple Means of Expression**  **Excellent list of formative assessments. I also appreciate the heads up of what summative assessment coming forth.**  **This entire lesson and unit take math concepts into real world applications in everyday life. You are going to be an excellent math teacher.**   * Questions will be posed to each group about what a hypothesis is and what students have come up with so far. I will give verbal feedback on their work so far and tips on developing their hypothesis. * Exit tickets: Three problems will be posted (easy, moderate, and hard) that students will have choice to answer. Instruct students that if they finish their chosen problem before end of class that they should work on solving the next hardest problem or come up with their own scenario that requires the use of one variable equations/inequalities to solve. Exit tickets will be graded and returned to students the next day with brief feedback on their work. * Thumbs Up/Down/Middle to check for understanding of creating equation, inequalities, and exponential functions. For students who express thumbs down, I will ask what portion they did not understand.   Before end of class, inform students of summative assessment requirements. All students will take summative test at end of unit and also choose one of the following activities for their assessment:   * Create a unique realistic situation that explains one of the unit’s topics * Create a short PowerPoint explaining how to solve one of the unit’s topic problems * Share an explanation of how to solve one of the topic problems in front of the class * Create and perform a skit (individually or in a group) of a situation requiring the use of one of the topics skills and demonstration of the solution.   *Explain how you will differentiate assessments for each of the following groups:*   * English language learners (ELL):   Exit ticket will be written in native language.   * Students with special needs:   Optional levels of difficulty are available.   * Students with gifted abilities:   Challenging levels of difficulty are available in exit tickets, or option come up with your own situation/equation.   * Early finishers (those students who finish early and may need additional resources/support):   Work on Burger King Hypothesis as a group or compacted curriculum/independent study. | **Time Needed** |
| **10 minutes** |
| **Extension Activity and/or Homework**  **Including parent input from work related experience is perfect. Anytime you can involve parents will truly be to your opportunity to build community relations.**  Homework: Ask a parent/guardian to describe a problem they encountered at work recently. Have them describe how they solved or intend to solve the problem and whether or not they used a mathematical method to solve it. Using the information they gave you, create an equation or inequality that would solve (or help solve) the problem. Bonus points for creating an equation/inequality that incorporates an exponent!  This activity directly practices the skills of creating one-variable equations with a real situation that is very relevant to the student and their family. By using a career driven scenario, students can see the relevance of being able to create equations to help solve problems easier. As students practice these skills in real-world scenarios, the more competent they will become at creating equations and inequalities that help solve problems. Asking their parents how they solved it also give them the perspective of other methods of practical problem solving. | **Time Needed**  **Done at home** |

Reference

Utah Education Network (n.d.). Secondary Mathematics 1. Retrieved from https://www.uen.org/core/core.do?courseNum=5600

Collaboration with Colleagues

Effectively designing and delivering this lesson would require collaboration with media professionals, teacher aides/paraprofessionals, and several other types of content teachers. Collaboration with media specialists would be vital to this lesson in many ways. If the school did not already have textbook access on students’ tablets, this would be a major undertaking that would require the help of the media specialist. This, as well as compacted curriculum, would be a huge task to accomplish with the media specialist’s help. There would also be a need to add videos of each lesson to student accessible software, preparing the video used within the anticipatory set, incorporating software that enables ELL students to hear/read directions in their native language, and to read directions aloud for students with special needs. Along these same lines, since some of the activities require student creation using technology, collaboration with the computer/technology teacher to determine students abilities with programs such as PowerPoint would help student learn cross-disciplinary skills and ensure their success using such programs. Collaborating with the English teacher in the same grade level would be a wise idea to determine if the vocabulary terms are at the correct developmental level for the students. He/she could also suggest methods for best teaching new vocabulary words, especially to ELL students or student with special needs. Translating materials into ELL student’s native language(s) would also possibly require working with the ELA teacher, who could suggest suitable software that students could use for translation purposes. Working together with other mathematics teachers would be crucial to develop a summative test, to come up with appropriate and challenging word problems, and to develop a compacted curriculum (if the school did not already have it available). In the delivery of the lesson, communicating with any available aides/paraprofessionals the details of the group activities would be great to help the activities to run smoothly and to help the aides/paraprofessionals explain content to students who may struggle. Only through collaborating with these many important professionals will this lesson reach its height of effectiveness.