**Name:** Laura Bryant, RSU24 Adult Education

**Class type:** College Transitions  **Student level (by CCR):** Level C/D

**Lesson topic:** Applying percent to solve a problem

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| **Description of a CCR-aligned formative assessment** |
| 1. **What is the purpose of the lesson?**   What do you want students to understand or be able to do by the end of this lesson? What are the real-life purposes that make this topic relevant to students? Which CCR standard(s) (at the level) are you focusing on?  Help students become flexible problem solvers. Be able to utilize multiple pathways to solving problems. Think mathematically, explain their reasoning and evaluate the reasoning of others. Use ratios to solve problems.   * Make sense of problems and persevere in solving them. (MP.1) * Construct viable arguments and critique the reasoning of others. (MP.3) * Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. (6.RP.3) * Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error. (7.RP.3) |
| 1. **How will teacher and students know progress or success when they see it?**   What can you and they look for to know if students are learning the standard? What can you (and they) look for to know if students can apply the standard to carry out real purposes?  Instructor will know students have met the learning standard for ratios if they arrive at the correct solution with a reproducible strategy. Through the discussions students will be able to test their knowledge and see how it relates to the strategies of other students. When the process is repeated with different tasks, students will have the opportunity to demonstrate progress and continued mastery of the standards of mathematical practice. Depending on the goal for each student, success can be measured in development of a plan, accuracy, number of solutions developed, flexibility in solving, explanation of their own solution and evaluation of others’ solutions. |
| 1. **What kind of tool/process would capture evidence of understanding or performance?**   Is this knowledge that might be demonstrated by a quiz, discussion, Q&A, etc.? Is this a skill to be performed and assessed with a checklist or rubric? Is the tool/process usable as part of or immediately following instruction?  This process captures learning primarily through the discussion following the problem solving time. While there is not a checklist or a rubric, it provides an opportunity for goal setting with individual students. For some that may mean coming up with a solution within the timeframe and for others it might mean setting a goal for multiple solutions or planning to work without paper and pencil. Once students understand the process it can be used at any point in the instruction, both during and after and for that matter, before.  Students will be able to demonstrate their learning through their development of strategies for the task at hand. They will demonstrate their learning through a discussion of their own and others’ strategies. In order to evaluate the effectiveness (and accuracy) of different strategies they will need a solid understanding of the content covered as well as problem solving and critical thinking strategies. |
| 1. **How would you use the tool/process?**   How would you involve students in creating or understanding the tool/process? How would you use the information gleaned from the tool to give feedback to students?  Ideally this process would be used often throughout a semester. It would work best if students had multiple chances to interact with it and practice expanding their thinking. Students gain feedback from other students throughout the course of the discussion and have a chance to evaluate their learning and see how their methods either differ or match that of other students.  The process provides students with multiple pathways to success and encourages alternate solution seeking, decision-making about effective solutions, and an opportunity to explore their reasoning. As students become more familiar with the process they can begin working with the instructor to develop personal goal setting based on their progress such as: arriving at an accurate solution within the timeframe, developing a certain number of strategies within the allotted time, solving tasks without the use of paper and pencil, etc.  The discussion informs the instructor of the level of understanding of each student and some students may need to develop goals around their participation in the discussion more so than their interaction with the task. Following the discussion the instructor will follow up with each student developing a plan of action for skill development when needed and goal setting for future tasks. |

**For this process students were presented with the following task:**

Find the final selling price for a skateboard priced at $27 with a 5% tax.

Remember once you’ve found your solution begin thinking about alternate routes towards finding an answer.

(Examples of methods used)

* Proportion method x/27=5/100
* Proportion method x/27=105/100
* 0.05(27)=1.35 +27 = $28.35
* 1.05(27)= $28.35
* Ballpark with adjustments 10% is 2.7 cut in half and add total
* Ballpark with adjustments 1% is .27 times five and add the total
* 5% is 1/20 so divide 27 by 20 and add the total

THUMBS UP: Students begin considering the task with their fist in front of their chest. When they think of a strategy for solving the problem they put their thumb out to the side. When the strategy turns to a solution they turn their thumb up. Then they begin to look for alternate solutions. For each alternate solution they extend an additional finger.

DISCUSSION: Once students have had time to work with the task a discussion begins around solutions. Students describe, compare and evaluate each other’s strategies and solutions. Ultimately each strategy is categorized as one that would always, never or sometimes work for the type of task at hand.