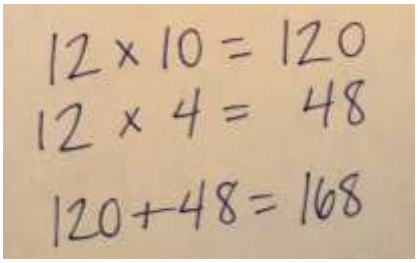
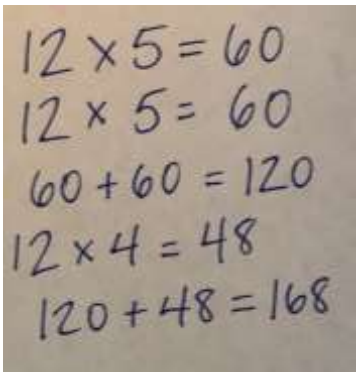
Number Talk Design EXAMPLE

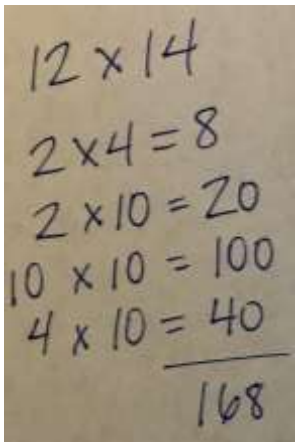
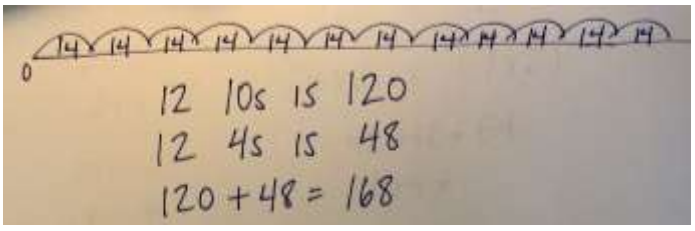
Grade Level: 4th TEKS: The student is expected to use strategies and algorithms, including the standard algorithm, to multiply up to a four-digit number by a one-digit number and to multiply a two-digit number by a two-digit number. Strategies may include **mental math, partial products, and the commutative, associative, and distributive properties**

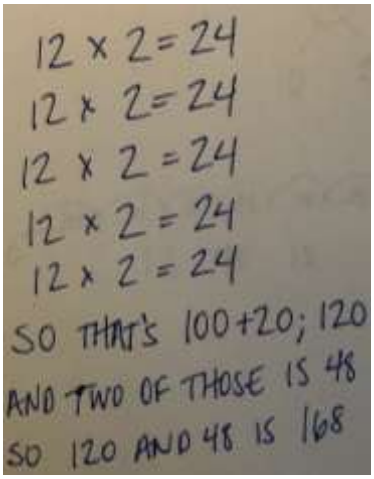
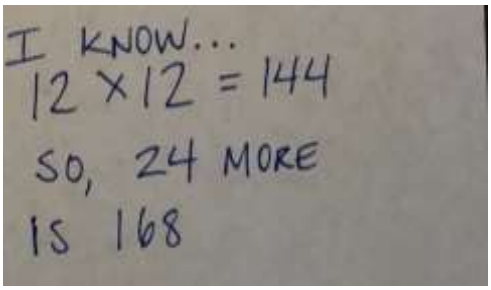
Mathematical Focus or Idea: 2 Digit x 2 Digit Multiplication

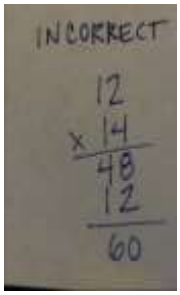
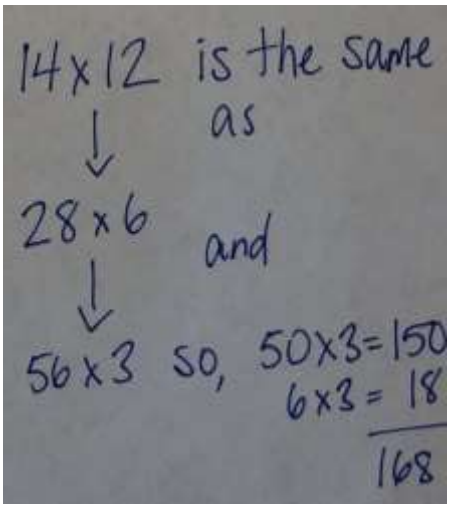
Number Talks Problem(s): **12 x 14**

Anticipated Student Responses - Student Talk - How could students respond? List all possible solutions and strategies. Teacher Question/Response - How will you respond? What if students "get it," what if they don't? How will you respond? Don't forget to list ways students might get an incorrect solution…how will you respond? What question will you ask?

Student Response 1	Teacher Move
Student Talk: *I multiplied 12 x 10 and got 120 and then 12 times 4 and got 4 so 120 and 48 is 168* *Teacher Question/Response:*  	Tell me about where you got the 10 and 4 from? (Student decomposed 14 into 10 and 4.)
Student Response 2	**Teacher Move**
Student Talk: *I multiplied 12 x 5 and got 60 and then I did that again. 60 and 60 is 120. Then I knew that 12x4 is 48 so I added 48 to 120 and got 168.* *Teacher Question/Response:*  	So I noticed that you multiplied by 5, why did you choose to solve it this way? (The student decomposed 14 into 5, 5, and 4)

Student Response 3	Teacher Move
Student Talk: *So I multiplied 2x4 and got 8. I multiplied 2x10 and got 20 and then 10x10 is 100 and 4x10 is 40. 20 and 40 is 60 and 100 is 160 and 8 more is 168.* *Teacher Question/Response:*  	Talk to me about how your strategy is different from the first two? Why does this strategy work? (The student is using partial products to solve.)
Student Response 4	Teacher Move
Student Talk: *I counted 12 fourteens and saw that there were 12 tens which is 120 and 12 fours which is 48. Put those together and it's 168.* *Teacher Question/Response:*  	Looking at the board, what strategy is similar to yours? What's different about it? (The strategy is similar to STUDENT 1 without the groups of 14.)

Student Response 5	Teacher Move
Student Talk: *I multiplied 12x2 is 24 because I know that and I did that 5 times because 5x2 is 10. So that would be 120. Then I just added two more groups of that to get 48 and 48 more is 168.* *Teacher Question/Response:*  	I noticed that you used 12x2, why did you use that fact 5 times? (The student decomposed 10 into 5 groups of 2.) You said you added two more groups of those…what does that mean? (The student added 12 groups of 2 and 12 groups of 2 to get to 48.)
Student Response 6	**Teacher Move**
Student Talk: *I know that 12 x 12 is 144 so 24 more is 168.* *Teacher Question/Response:*  	Talk to me about 24 more…how did you get that part? (The student decomposed 14 into 12 and 2 so they needed 2 more groups of 12 which is 24.)

Student Response 7	
Student Talk: *First I multiplied 2 x 4 and got 8 and then I multiplied 4 x 1 and got 4. Next, I multiplied 1 x2 and got 2 and 1 x 1 and got 1. I added those two numbers and got 60.* *Teacher Question/Response:*  	The student attempted the traditional algorithm. Can you tell me about what the one means in these numbers? (I'm trying to push toward place value.)
Student Response 8	Teacher Move
Student Talk: *So, 14 x 12 is the same as 28 x 6 and it's the same as 56 x 3. So that's an easier problem for me because 50 x 3 is 150 and 6 x 3 is 18 so 150 and 18 is 168.* *Teacher Question/Response:*  	(The student is using doubling and halving to solve the problem.) Can you tell me more about how you double the first number and halved the second number? Why does that work? Can you tell me if that will always work with multiplication or give me another example?

Differentiation (Write down some problems that differentiate your problem.)

Let's look at 12 x 4, how can that help us solve 12 x 14? What do you notice about the numbers?

Since we know 12 x 14 is 168, how can that help us solve 12 x 15 or 12 x 24?

How can 12 x 4 and 12 x 10 help us in solving 12 x 14. Why does that work?

Questions to elicit critical thinking:

- How did you count?
- Why did you decompose the numbers?
- How did you get that?
- Tell me what you are thinking.
- Which strategies are similar?
- Which strategies are different?
- Can you give me an example?
- Why did you double?
- Why did you choose to solve it this way?

Questions for closing the lesson:

1. Write your name on this sticky note; put your sticky note by the strategy that makes the most sense to you.
2. Give me a thumbs-up if one of these strategies makes sense to you today.
3. What were we learning about today?