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Mrs. Hines-4th Grade
Math Methods
November 15, 2011

Introducing Multiplication Three-Digit Numbers by One-Digit Numbers

Total Time: 1 hour

I. Topic: An introduction to multiplying greater numbers in which the students will use their previous knowledge in multiplying three-digit numbers by one-digit numbers.

II. OBJECTIVES/STANDARDS

- **Objective:** Given graph paper and a multiplication table if needed, TSWBAT correctly solve standard problems and word problems multiplying three digit numbers by one digit numbers to 90% accuracy.
- **Vocabulary:** carrying, regrouping
  - *Carrying:* To move numbers from a given place value, or column, to the next greater place value. When the results of addition or multiplication are a number greater than 9, the number is regrouped this way. The ones are put in place, and the other values are carried to the next column.
  - *Regrouping:* To change the grouping of numbers by separating ones, from tens, from hundreds, and so forth, and grouping the parts of the numbers with other like values.
- **Goal:** Students will begin to understand that multiplying three digit numbers by one digit numbers is very similar to multiplying two digit by one digit numbers, except that we are adding one more place value. Students will activate prior knowledge using regrouping and understand the concepts behind three digit multiplication.
- **PDE 2.1.4.F**- understand the concepts of addition and subtraction and their inverse relationships: understand concepts of multiplication and division use the four basic operations to solve problems including word problems and equations.
- **NCTM Content Standard-** Develop fluency in adding, subtracting, multiplying and dividing whole numbers.

III. TEACHING PROCEDURES

- **Anticipatory Set: (7 minutes)**
- Have students sit in groups that have been predetermined by the teacher. Students will listen carefully as the teacher reads a small section of Charlie and the Chocolate Factory. **(part of page 53. Small portion of 54 and 55)**

- The teacher will read the designated page, dressed in full costume as Willy Wonka. After listening to the story, the teacher will explain the three day mission that the students have been given to complete with their group members.
- **I put you in groups for a special reason. Group number one is the Everlasting Gobstoppers, group number two is the Wonka Bars, group number three is the Laffy Taffy's, group number four is the Candy Canes and group number five Is the Swirly Lollipops. All of these groups have been picked by Willy Wonka himself to help solve multiplication problems to make production easier. The next three days we will be learning about multiplying three digit numbers by one digit numbers. The numbers will change depending on the amount of candy that is ordered from the factory each day.**
- **Before we begin, Mr. Willy Wonka wanted me to introduce to you a special lollipop he has been working on for the past couple of weeks. This lollipop is known as the quiet pop. The purpose of this pop is really quiet magical. Whenever this lollipop is help up in the air by one of the teachers your lips magically stick together and you quietly wait for instructions. Whenever the classroom is too noisy or Miss Sloan and I are trying to get your attention you may see this lollipop up in the air. When this happens you should remain focused and put your eyes on the teacher.**
- **Just to see what you know so far, I'm going to have you copy down the problem on the board on the graph paper that has been provided for you. The graph paper will make it easier for you to keep your numbers in line. I also want each of you to grab some of the base ten blocks that are located in the middle of your group table.**
    - After all of the students have taken base 10 blocks from the center of the table, read the problem on the board. ***3 customers ordered 14 gobstoppers each.***
    - Ask: ***How many gobstoppers are there in all? How can we use multiplication to set up this problem?*** (Answer: I would set up my problem by writing 3 x 14.) **Excellent, there are three customers who need 14 gobstoppers each so there are 3 groups of 14 gobstoppers.**
    - **Using our base ten blocks, how would we represent 3 x 14? (**Answer: we would make three groups of 11 blocks each.) **Excellent! On the board right now I am going to draw my three groups of 14 and you are going to make three groups of 14 using your base ten or ones blocks. Don't hesitate to ask me or Miss. Sloan if you have questions.**
    - Make sure all of the students have sorted their blocks into three groups of 14 before moving on to the next step. Walk around to scan the classroom for signs of confusion or inattention.

- Once all the students are finished creating their groups Ask: **What are we going to do first with this problem? (**Answer: we are going to multiply the ones - 4 x 3.) **Excellent. And what do you get when we multiply 4 by 3. (**Answer: You get 12)
- **Ask: If 4 x 3 is 12 then do we have to regroup?** (Answer: Yes we do have to regroup) **Why do we have to regroup?** (Answer: 12is bigger than 10)
- **Since 12 is bigger than 10, we can regroup 12 ones as 1 group of ten with 2 ones leftover. Looking at the problem we can put a 2 below the line since we will have 2 ones left and put a 1 above the 2 since we grouped 10 of those ones into 1 long. Now take your base 10 blocks and trade in 10 of your ones cubes for 1 long.** If necessary, reemphasize the fact that I long is equal to 10 units.
- **Ask: What is our final step of the problem?** (Answer: We need to multiply the 3 tens x 1 ten which equals three tens and add the 1 ten that was carried over to equal 4 tens)
- **Excellent, when we bring down the 4 our final answer reads 42 total gobstoppers are needed for shipment today.**

Development: (20 minutes)

- **In a previous lesson you learned about multiplying two digit numbers by one digit numbers. Since Willy Wonka is shipping more candy out to his customers, today we are going to be learning how to multiply 3 digit numbers by 1 digit numbers.** Ask students: **Why is it important that we learn multiplication? How can you use this skill in your own life?** Explain to the students that multiplication is extremely important when dealing with money or figuring out how many place cards are needed at a wedding; it is also an important skill in chocolate productions.
- **The only difference between multiplying two digit by one digit numbers and multiplying three digit by one digit numbers is that we are adding an extra place value. Instead of the ones place and the tens place, there is now a ones place, tens place and hundreds place that we have to multiply.**
- Pass around a multiplication table to use as a scaffolding method for students who are unsure of their multiplication facts. **I am going to pass around a multiplication table just in case you forget one of your multiplication facts. Please do not hesitate to use this if you feel stuck or you need a quick refresher on a specific problem. If you don't need the multiplication table because you are confident in your facts, you may tuck it under your notebook.**
- Have the students look at the new problem on the board. (problem: 125 x 6) **Looking up at the board, I want you to copy down the same problem on your piece of graph paper and we will complete this one together.**

- **Ask: What is the first step we need to take to solve this problem?** (Answer: We need to multiply the ones: 5 x 6) **Very good.**
- **Ask: Do we need to regroup, and if so what number do we put below the line?** (Answer: We need to regroup 30 because the number 30 is greater than 10.) **Excellent. 30 can be split up into 10ones + 10ones + 10ones. 10 ones equals 1 ten so we have 1 ten plus 1 ten plus 1 ten which equals 3 tens. We are going to regroup 30 into 3 groups of 10 so that there is zero ones left over. The zero goes below the line in the ones column because there are 0 ones and we carry the 3 up above the two in the tens column since we have 3 tens.**
- **Ask: What is our next step?** (Answer: We need to multiply the tens. 2 x 6 is 12 plus 3 extra tens carried over from the previous step is 15) **Since we have 15 tens which is greater than 9 now we need to regroup. We can write the number 15 as 10 tens plus 5 ones. 10 tens equals 1 hundred so now we have 1 hundred plus 5 tens. We need to put the 5 below the line under the tens column and carry 1 group of one hundred up next to the one in the hundredths place.**
- **Ask: What is our final step in this problem?** (Answer: we need to multiply the hundreds. 1 x 6 = 6 plus the 1 hundred carried over from the previous step the answer is 750)
- Make sure that during this developmental period that the students understand the concepts behind three digit multiplication. If necessary, stop to review a particular part of the problem if students are having trouble. (mid-workshop session)
- **Now that we have tried a problem together, I'm going to hand out a practice sheet that has two more problems that we will complete together as a class. When you get the worksheet from myself or Miss Sloan, read over the directions carefully and wait for further instructions.**
- Ask students: **What is the first step we need to take in completing this first problem?** (Answer: we need to multiply the ones: 7 and the 4 which is 28) **Excellent. Since 28 is bigger than 10 we can write 28 like this: (10ones + 10 ones+ 8ones = 28) Again, since 10 ones equals 1 ten this means we have 2 groups of 10 and 8 ones left over. The 8 gets put below the ones column and the 2 tens get carried over above the tens place in the next column.**
- Ask students: **What is the second step in solving this problem?** (Answer: We need to multiply the tens- 4 x 1 = 4 plus the two tens carried over from the last problem which equals 6 tens.) **Yes. 4 x 1 = 4 plus the two tens that were carried over is a total of 6 tens.** Ask: **Did we need to regroup this time?** (Answer: No, because 6 is less than 9)
- Ask students: **What is the final step in solving this problem?** (Answer: We need to multiply the hundreds- 5 x 4 = 20) Our final answer is 2068.

- **Excellent. 20 is bigger than 10 which means that you can write 20 as 10 + 10. Since 10 groups of 1 hundred equal 1,000 this means you have 2 thousandths that can be carried over with 0 hundreds left. You put the 0 below the line in the hundredths column and carry over 2 into the thousands column. Since there are no other numbers in the thousands place, you bring the 2 straight down below the line. The final answer is 2068.**
- **Before I let you work in your groups I have one more problem that I want to complete with you. This time however, I am going to call on volunteers to explain each step without any help from me or Miss Sloan. Remember to explain each of the steps when I call on a volunteer and if we need to regroup tell us why. Are my Oompa Loompas ready for the challenge? (Problem: 821 x 3)**
- Ask Students: **What is the first step in completing this problem?** (Answer: we need to multiply the ones: 3 x 1 = 3. Since three is less than 9 we do not need to regroup.)
- Ask Students: **What is the second step in completing this problem?** (Answer: we need to multiply the tens: 3 x 2 = 6. We do not need to regroup because 6 is less than 9)
- Ask Students: **What is the final step in completing this problem?** (Answer: multiply the hundreds. 8 x 3 = 24. 24 is bigger than 10 and can be written like this: 10hundreds + 10hundreds + 4hundreds. 10 hundreds equals 1 groups of one thousand. Thus, there are 2 groups of 1,000 and 4 hundreds left over. You put the 4 below the hundreds column and carry the 2 thousands over into the next column. Since there are no other numbers, drop the 2 straight down under the line. The final answer is 2463.

Guided Practice (23 min)

- Pass out the group worksheet and explain directions carefully to the students.
- **Now that all of you Oompa Loompas have undergone 30 minutes of intensive multiplying training, and you officially ready to enter Mr. Willy Wonka's Factory I have an important mission for all of you. If you look at the worksheet that Miss Sloan passed out, you will notice that you have been given two problems to solve with your group. There are five groups and 10 problems so every group should have two problems to complete together.**
- Understand the problem**:** The students will learn from this activity how to set up a three digit multiplication problem by reading the corresponding word problem on their worksheet.
- Devise a Plan**- You and your group members will have to agree on the proper way for setting up the problem using the context clues I have given you. Make sure that**

you read the word problem carefully. If you need help setting up the problems ask Miss Sloan or me for help.

- Solve the problem- Students will work together in solving their candy problem using the worksheet provided.
- Check your answer: After the students have completed the first problem with their other group members they are to compare answers and then raise their hand to have a teacher check their problem. The teacher will also answer questions to check the students' understanding.
- After most of the students have completed both of their problems, one group member from each team will come up to the board and explain their answer to the first problem they solved on their worksheet. This will allow the student to practice procedural fluency and conceptual understanding.
- **Every student needs to show their work in order for your group to receive a point. Remember these points will be cashed in on the last day for a surprise. If you have double checked the first problem, raise your hand and have a teacher come and check your work. If the teacher sees that you have the correct answer, you can move on to complete problem number 2. Any Questions?**
- If the students complete both problems correctly they earn two points for their team. If they complete one problem correctly, they score one point from their team. These points will be cashed in on the third day and added to the final game score to determine the winner of the golden tickets.

- **Independent Practice (6 minutes)**

- Each student in the group will receive an independent worksheet once they have completed the two problems with their group members. The independent worksheet will have 5 standard multiplication problems to check for accuracy and understanding. If the students do not finish this worksheet they may take it home and finish it for homework. **When you are finished with your group work, raise your hand quietly and the teacher will give you an independent worksheet with extra practice problems.**

- **Closure (4 minutes)**
- **What is the difference between two digit multiplication and three digit multiplication?** (Answer: The only difference between multiplying two digit by one digit numbers and multiplying three digit by one digit numbers is that we are adding an extra place value. Instead of the ones place and the tens place, there is now a ones place, tens place and hundreds place that we have to multiply.

- Write one more problem on the board. (159 x 5) Ask: **What is the first step in completing this problem?** (Answer: multiply the ones 9 x 5 = 45) **Excellent. Since 45 is greater than 9 we can write 45 as 10 + 10 + 10 + 10 + 5 = 45. Since 10 ones equals 1 tens we have 4 groups of ten to carry over above the tens column with 5 ones leftover.**
- Ask: **What is the second step in completing this problem?** (Answer: multiply the tens 5 x 5 = 25 plus the 4 tens carried over from before is 29.) **Excellent. 29 can be written as 10 + 10 + 9. 10 tens = 1 group of one hundred. Since we have two tens we have to carry over 1 groups of one hundred into the next column with 9 tens left over.**
- Ask: **What is the third step in completing this problem?** (Answer: multiply the hundreds 5 x 1 = 5 plus the 2 hundreds carried over from before equals 7) **Nice work! The final answer if we carry down our 7 is 795.**

IV. MATERIALS

- Base ten blocks
- Graph paper
- Willy Wonka *Exercise -Multiply two digit by three digit numbers*
- Willy Wonka *Group Worksheet*
- Willy Wonka *Independent Practice Worksheet*
- Willy Wonka *Enrichment Worksheet*

V. MODIFICATIONS/ADAPTATIONS

- For struggling learners, make sure that they are in a group with a stronger math student. Monitor both the guided and independent practice to see if they understand the concepts behind multiplication. If needed, during guided practice, the teacher can work individually work with a student at his/her desk.
- To extend learning, give students: *Enrich: Willy Wonka Three Digit Multiplication*

VI. STUDENT EVALUATION

- Were the students able to understand the principles of regrouping with two digit multiplication? What about three digit multiplication?
- Were the students able to understand the new concepts of three digit by one digit multiplication?
- Did the students understand how to set up a three digit multiplication problem by reading the corresponding word problem?

- How were the students actively involved in understanding this lesson?

VII. TEACHER EVALUATION

- How did I prepare this lesson to ensure the students clearly understood the concept of three digit multiplication?
  Did my assessments accurately measure the students' knowledge of multiplication?
- Was I professional in the way I interacted with my students?
- What activities and strategies worked well during my lesson?
- What changes would I make if I taught this lesson again?