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The Game of Target 300

by Maryann Wickett and Marilyn Burns
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The lesson below is an excerpt from Maryann Wickett and Marilyn Burns's new book, Teaching Arithmetic: Lessons for Extending Multiplication, Grades 4–5 *(Math Solutions Publications, 2001). The book extends the teaching from Marilyn's new book* Teaching Arithmetic: Lessons for Introducing Multiplication, Grade 3 *(Math Solutions Publications, 2001). In this lesson, fourth and fifth graders gain experience multiplying by ten and multiples of ten as they make choices about the numbers to use to reach the target amount of three hundred.*

I began the lesson, "Today I'd like to share a game with you. In this game you will be multiplying by ten, twenty, thirty, forty, or fifty." I wrote the following on the board:

x 10

x 20

x 30

x 40

x 50

"You'll play with a partner. The goal of the game is to be the player closest to three hundred. It's OK to get less or more than three hundred, but the goal is to be the closest."

Allie asked, "Does that mean that one person could have two hundred eighty, and be twenty off, and the other person could have three hundred ten, and three hundred ten would win because it's closer to three hundred?"

I asked the class, "What do you think is the answer to Allie's question?" Hands went up.

Rachel said, "You said it was OK to go over three hundred. So the player with three hundred ten wins."

"You're right," I said and continued, "You'll each take six turns. When it's your turn, roll a die. Then decide if you'll multiply the number you rolled by ten, twenty, thirty, forty, or fifty. Remember, you want to get closest to three hundred, and you must take all six turns."

Ben	Mrs. Wickett

"Oh, this will be fun!" Steve said. "Do we have to write?"

I responded, "Yes. To show you how to do the recording part, I'd like to have a partner play the game with me." Hands immediately shot into the air. I called on Ben because I knew he had a good grasp of multiplying.

"When you play this game, each of you will need your own recording sheet," I said as I drew two two-column charts on the board, one for me and one for Ben. "I'll put Ben's name on one side of my chart and mine on the other," I said as I labeled my chart. Ben did the same on his.

I went first so I could model out loud my thinking process as well as how to record. I rolled a 1. I said, "One isn't a very large number. If I multiply one by ten that will only give me ten. I'll still have two hundred ninety to go in five turns. That seems like a lot. Maybe I should multiply by thirty; one times thirty equals thirty. Thirty is closer, but I still have two hundred seventy to go. I think I'll multiply by fifty; one times fifty equals fifty. That's closer still and it means I'm only two hundred fifty away. Do you agree that one times fifty equals fifty?" I asked Ben. Ben nodded. I recorded my turn on my side of the chart.

Ben	Mrs. Wickett
	$1 \times 50 = 50$

Once Ben had recorded my turn on his chart, I handed him the die, indicating it was his turn. Ben rolled a 2. "I'll multiply by ten. That gives me twenty. I don't want to get too close to three hundred early in the game in case I get big numbers at the end," Ben said. We both recorded his turn on our own charts. Ben handed the die back to me.

This time I rolled a 4. "I am going to multiply by twenty. That gives me eighty for this turn. This time when I record, I'll record four times twenty equals eighty, then I'll add the fifty from my first turn to the eighty I just got, for a running total of one hundred thirty," I explained as I wrote my score on my chart.

Ben	Mrs. Wickett
$2 \times 10 = 20$	$1 \times 50 = 50$ $4 \times 20 = 80$ 130

"How come you didn't multiply four times fifty?" wondered David. "That would have given you two hundred. Add the two hundred to the fifty from your first turn and that would be two hundred fifty. You could almost win on your second turn."

Several students put their hands up to respond. I called on Cindy. "Each player has to take six turns. This is Mrs. Wickett's second turn and she has to take four more turns. If she got two hundred fifty by the end of her second turn, then she could only get fifty more to get three hundred! She'd have to always roll really low numbers and multiply by ten. She'd probably get some low, some medium, and some high, and go way over three hundred."

Some students didn't follow Cindy. I decided to move on rather than continue to discuss this point. "I think Cindy's idea will be clearer after you've had the chance to watch the rest of this game and play for yourself," I said. I handed the die to Ben. Ben rolled a 1.

He said, "I'm going to multiply one times thirty to get thirty. Now I have fifty." Ben recorded his turn on his chart and I did the same on my chart. He gave me the die.

"I rolled a six!" I said.

"You could multiply six times fifty and get three hundred!" Mario said. "Too bad you have to take six turns!"

"Mario is right. What would work better?" I asked the class. Hands immediately went up. I called on Allie.

"I think ten because if you multiplied six times ten that would be sixty," Allie shared. "Then you'll have one hundred ninety. Subtract that from three hundred and you still have three turns to get one hundred ten more points."

Ben and I recorded my turn on our charts. I handed the die back to Ben. He rolled a 5.

"Look, I can win!" he said. "I just multiply five times fifty. That equals two hundred fifty. Two hundred fifty and fifty is three hundred! I win unless you get three hundred too, then we would tie," Ben explained.

Several students moaned. Ben looked surprised.

"Ben, you still have three more turns! You have to take them," Leigh reminded Ben.

"Oops!" Ben said. "I forgot. I'll multiply by ten. That only equals fifty, so my total is one hundred. That's way better." Ben recorded his turn on his chart and handed me the die.

After our next two turns, I had 290 and Ben had 260. "I'm in much better shape than Mrs. Wickett!" Ben said.

"What do you think about Ben's statement that he's in better shape than me?" I asked the students.

"Well, you have to roll a one and multiply it by ten to get exactly three hundred. That's not likely," Steve said.

"Why not?" I asked.

"It just doesn't seem like that will happen," Steve said.

Rachel said, "I think all the numbers on the die have the same chance of being rolled. There are six sides on a die. One is on only one side of the die so it has one out of six chances of being rolled."

"Mrs. Wickett can only get exactly three hundred one way, by rolling a one," Tom added. "But Ben needs forty points. He could get forty by rolling a one and multiplying by forty, or getting a two and multiplying by twenty, or getting a four and multiplying by ten."

I said, "I'll roll the die and let's see what happens." I rolled and got a 3. Ben looked delighted.

"Well you just have to make the best of it and multiply by ten," Cindy said.

"That gives me a final total of three hundred twenty," I said. Giggling with delight and anticipation of getting exactly 300, Ben rolled. He got a 3.

"Oh!" he said with a surprise. "I didn't get a one, a two, or a four." He paused for a moment to think the situation over.

"Ben, you can still win," Rachel said.

"I know, I could multiply three by ten and get two hundred ninety," Ben said. The class cheered and Ben did a little victory dance. I waited for a few moments for the students to settle down and then showed them what else to record when they played. I wrote on the board under my chart:

Ben won.

Ben was 10 points away from 300.

Mrs. Wickett was 20 points away from 300.

I also wrote prompts for students who might need them:

_____ *won.*

_____ *was* _____ *points away from 300.*

_____ *was* _____ *points away from 300.*

The students played the game with great enthusiasm and involvement as partners participated in every turn.