Multiplying and Dividing Mentally
Check Your Understanding

One indicator of how well a student understands multiplying and dividing mentally is to compare a student's work and explanation for a problem with how other students have responded to the same problem. Students, parents, or teachers can use the following problem and sample responses to evaluate understanding.

Directions for the Student:

1) Solve the following problem and explain your work and answer.
2) Compare your work to the sample responses in order to determine if your work indicates deep, partial, or beginning understanding.

Problem:

The fifth grade class was raising money for a field trip. They sold 80 tickets to a class program. Each ticket cost $3. How much money did the class raise from the program?

Level of Understanding	Sample Student Response	Comments
Deep Understanding	**Student 1:** "Three times 80 is like 3 x 8 tens, so it's 24 tens or 240. That's $240."	This student knows that 3 x (80) is 3 x (8 x 10) or (3 x 8) x 10, which is 24 tens or 240. By using tens, the student can easily multiply larger numbers.
	Student 2: "Three x 40 is 120, so 3 x 80 is twice as much. That's 240."	This student knows that 80 = 40 x 2. Rather than multiplying 3 times 80, the student multiplies 3 times 40, which is half of 80, and doubles the result. 3 x 80 = 3 x (40 x 2) = (3 x 40) x 2 = 120 x 2 = 240

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Partial Understanding	**Student 3:** "Three times 80 is 80 + 80 + 80. So it's 80, 160, 240."	This student is using repeated addition to solve multiplication problems. This procedure works, but is inefficient when both factors are larger numbers.
	Student 4: "Three times 0 is 0. Three times 8 is 24. You write the 24 beside the 0 and you get 240."	This student knows the procedure for multiplying, but it is not clear that the student understands how to use tens to simplify the process so it can easily be done mentally.

Level of Understanding	Sample Student Response	Comments
Beginning Understanding	**Student 5:** "I don't know 3 x 80. I need a paper and pencil."	This student might be able to solve the problem using paper and pencil, but has not made sense of mental multiplication for larger numbers.
	Student 6: "Three x 80 is 3 x 0 and 3 x 8. That's 0 and 24, or 24."	This student is multiplying digit-by-digit and adding without recognizing that the 8 represents 80.