Understanding Decimals
Check Your Understanding

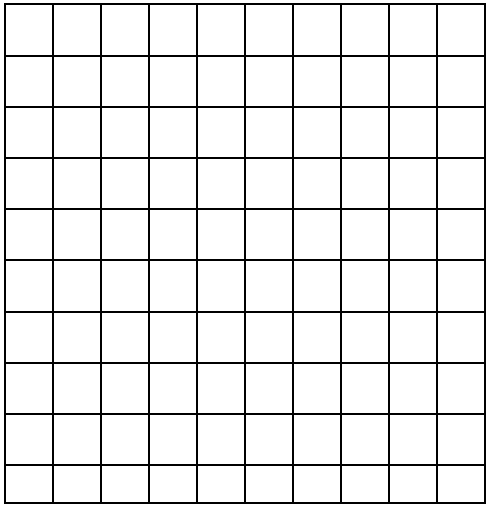
One indicator of how well a student understands decimals is to compare a student's work and explanation for a problem with how other students have responded to the same problem. Students, parents, or teachers can use the following problem and sample responses to evaluate understanding.

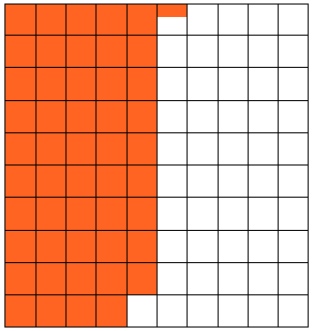
Directions for the Student:

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.

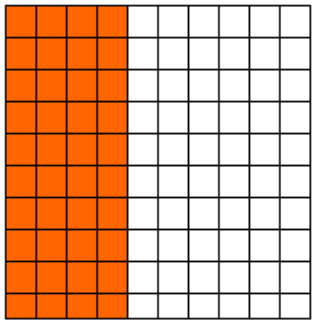
Problem:

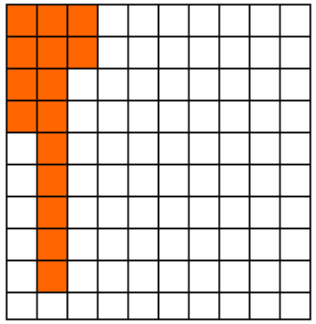
Janine had a piece of graph paper. It had 10 rows and 10 columns of little squares on it. She was supposed to color in 0.492 of the grid. How many little squares of the graph paper was she supposed to color? You may shade the following grid to represent your answer or describe your answer using words.



Level of Understanding	Sample Student Response	Comments
Deep Understanding	**Student 1:** "The 4 stands for 4 tenths, so she needs to color in 4 rows. The 9 stands for 9 hundredths, so she needs to color in 9 little squares in the next row. And the 2 stands for 2 thousandths which is part of a little square. That's almost 5 of the ten rows."	This student understands the place values for each digit in the number and can relate that to the graph paper. The student also understands that 0.492 is about one half.
	Student 2: "492 thousandths is a little bit more than 49 hundredths. So 49 little squares and just a bit more should be colored in. So just about half of the paper needs to be colored." 	This student knows how to correctly read a decimal and shows an understanding of place value. This student recognizes that 49 hundredths is about the same as 50 hundredths or one half.

Level of Understanding	Sample Student Response	Comments
Partial Understanding	**Student 4:** "4 tenths and 9 hundredths is about half. But thousandths are really small, so 492 thousandths has to be small. I don't get it."	This student has not resolved a conflict between knowing that thousandths are small and 4 tenths and 9 hundredths is nearly half. The student may not know that 400 thousandths is 4 tenths and 90 thousandths is 9 hundredths.

Partial Understanding	**Student 3:** "Color four columns of ten which equals 40." 	This student seems to understand how to represent the 4 in the tenths place, but does not seem to understand the meaning of the 9 or 2.

Level of Understanding	Sample Student Response	Comments
Beginning Understanding	**Student 5:** "I figured since they are not whole numbers I wrote 4, then 9, then 2. So I got 15 and shaded 15." 	This student needs to make sense of decimal place values.
	Student 6: "She needs to color 4 "oneths," 9 tenths, and 2 hundredths."	Some students believe that place values are symmetric around the decimal point. They are not. There is no "oneths" place. The student needs to make sense of decimal place values.