Standard Addressed by these Number Talks:

5.NBT.1 Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.
5.NBT.2 Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.

Pose these number sentences to students and ask them to solve them mentally. The student's role is to demonstrate fluent strategies for solving these problems. The teacher's role is to pose the problem, give students a few minutes to solve the problems and then lead a discussion about how they solved the problems. Teachers will need to write down students' thinking using number sentences that will show how students solved the problems. You need not pose all at once, but instead do a few each week during the unit (posing one problem in one setting, or a string of problems that build on each other in one setting or over the course of a week). Conversations may range from 10-20 minutes in length. See the article *Number Talks Build Numerical Reasoning (***October 2011** • teaching children mathematics) for more information.

Standard	Number Talk Problem Sets	Rationale
5.NBT.1 Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left. **5.NBT.2** Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10**.** Use whole-number exponents to denote powers of 10.	10 x 10 10 x 100 10 x 1000 100 x 1000 1000 x 1000 10 x 10,000 100 x 10,000 1000 x 10,000 10 ÷ 10 100 ÷ 10 1000 ÷ 10 10,000 ÷ 10 100 ÷ 100 1000 ÷ 100 10,000 ÷ 100 0.1 x 10 0.1 x 100 0.1 x 1000 0.1 x 10,000 0.1 x 1 0.1 x 0.1 0.1 x 0.01 0.1 ÷ 10 0.01 ÷ 10	These number talks are designed to get students to reason about our base 10 place value system and how it works. Students will start to notice patterns around multiplying and dividing by powers of 10, but be careful to not accept the answer, "I used the zero rule to find my answer." Though this "trick" will work, it is not the goal of these two standards that students know this trick. Instead, the goal is that students understand the mathematics behind the trick. Multiplying by 10 once shifts every digit of the first factor one place to the left in the product (the product is ten times as large) because in the base-ten system the value of each place is 10 times the value of the place to its right. So multiplying by 10 four times shifts every digit 4 places to the left. Students need a deep understanding of these patterns in order to have a firm grasp on our number system and how it works.

5.NBT.2 Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10**. Use whole-number exponents to denote powers of 10.**	10 x 10 10 x 10 x 10 10 x 10 x 10 x 10 10 x 10 x 10 x 10 x 10 100 x 100 100 x 100 x 100	When discussing these number talks, make sure that you introduce the exponent notation for students (i.e. that 10 x 10 x 10 x 10 = 10^4).