Standard addressed by this lesson:

4.NBT.1 Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. *For example, recognize that 700 ÷ 70 = 10 by applying concepts of place value and division.*

4.OA.1 Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 x 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication comparisons as multiplication equations.

Materials Needed:

- Base 10 blocks (ones, tens, hundreds, and thousands cubes)
- Math Notebooks

Pose the following problem to students:

- Show students a one, ten, and hundred base 10 block. Ask students to identify each and tell what each represents.
  - Ask students how many ones are in a ten. Write a notation to match what they say (either 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 = 10 or 10 x 1 = 10 [read 10 groups of 1 is 10]).
  - Ask students how many ones in 100. Write a notation to match what they say (the need for efficiency will show up here- if they start to say 1 + 1 + 1 … ask if they really want to write all those ones, or is there a better way to write it [i.e. 100 x 1 = 100; read 100 groups of 1 is 100)
  - Ask students how many tens are in 100. Notate their thoughts with a number sentence (either 10 + 10 + 10 + 10 +10 + 10 + 10 + 10 + 10 + 10 = 100 or 10 x 10 = 100 [read 10 groups of 10 is 100].
- Ask students to predict what the next base ten unit would be and what would it look like? How many blocks would it take? If a student suggests it, build the 1,000 cube using hundreds.
- Write the number 1,000 on the board. Ask students:
  - Ask how many hundreds are in a thousand block. Write a notation to match their thinking (i.e. 1000 is 10 groups of 100, 1,000 = 10 x 100.)
  - Then ask how many tens would make a 1,000 block. Write the following on the board under the other notations: ? tens = 1,000.
    - *Note: students may need a step in between 100 x 10 = 1,000. They may need to see that in every 100 there is 10 groups of 10 – this will help students start to see patterns in the number system- Notation may look like:*
      - *(10 x 10) x 10 = 1,000*
  - Lead a discussion for students to reason about how many tens it will take. Allow them to explore the idea using base 10 blocks either individually, in small groups or in pairs. Have them share their ideas and record what they say as they share. Try to write the number sentences that match their reasoning.
  - Ask students, "Does ten hundred equal one thousand?" Have the class discuss this idea and guide student discussion and record their ideas on the board.
  - Pose this idea to students:
    - ? ones = 10 hundreds = 1,000
  - Ask students to think about what patterns they are noticing. Record ideas on the board. (each one is ten times larger, you need 10 of the previous to make the next one, etc.)
  - Ask students to work together in pairs or small groups to think about the next block would look like. They can use the base 10 materials to help them. Ask them what number it would represent (It would be a ten-thousand long).
    - Ask how many 1,000 cubes would it take to make the next base 10 block?
      - If they struggle ask them- how many ones in a ten? How many tens in a hundred flat? How many hundreds in a thousands block? So, how many thousand cubes would it take to make the next block? (**AHA!** It takes ten of the previous base 10 block to make the next one- so each one is ten times as much as the previous one) What would it look like? – Have students work together to build it.

To wrap up, have student record their big ideas from today in their math notebook and share AHAs! as a class.