Decimal Points

Topic: CCSS 5.NBT.A.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.

Summary:

- **Patterns with Zeroes**
    - When multiplying by ten, we can add or subtract zeroes.
        - 5 x 30 is 5 groups of 3 tens or 5 x 3 x 10 or 15 x 10.
            - Another way to think about this is 15 groups of 10 or 150.
        - 0.8 x 200 is equal to 8 x 0.1 x 2 x 100.
            - Rearranging the factors results in (8 x 2)(0.1 x 100) or (16)(10).
            - Multiplying 16 x 10 is 160.

5 x 3 = 15	8 x 2 = 16
50 x 3 = 150	0.8 x 2 = 1.6
50 x 30 = 1,500	0.8 x 0.2 = 0.16
5 x 300 = 1,500	0.08 x 0.2 = 0.016
500 x 30 = 15,000	0.08 x 0.02 = 0.0016

Practice:

- **Describe patterns found in place value.**

- **Explain the pattern for the number of zeros in a product and how they relate to a power of 10.**

    - Use multiplication and zero patterns to find the product for each expression.

        - 7,000 x 40 = _____

        - 30 x 800 = _____

        - 100 x 600 = _____

        - 3 x 9,000 = _____

        - 50 x 70 = _____

        - 200 x 3,000 = _____

    - Mark decorates a cake with 6 rows of flowers. Each row had 20 flowers. How many total flowers did Mark use to finish the cake?

o There are 30 shelves in a store holding baseballs and basketballs. Each shelf has 10 basketballs and 20 baseballs. How many total balls are in the store?

- **Explain and represent why the decimal point shifts when multiplying and dividing by powers of 10.**

    o Use multiplication and zero patterns to find the product for each expression.

    - 0.006 x 0.5 = _____

    - 0.2 x 0.09 = _____

    - 1.1 x 0.06 = _____

    - 4 x 0.008 = _____

    - 6 x 0.6 = _____

    - 2.4 x 0.0003 = _____

    o A forklift is moving 20 pallets of sand. Each pallet weighs 0.3 tons. What is the total weight of sand lifted by the forklift?

    o Sarah buys a bag of candy containing 50 mini chocolate bars and 30 lollipops. Each chocolate bar weighs 1.5 ounces, and each lollipop weighs 0.3 ounces. What is the total weight of the bag of candy?