MA 2A	Mathematics Embedded Credit
Cape Career & Technology Center	**Last Update: April 2017**
Topic: Fractions, Decimals, Percents	**Focus: Basic Operations – Decimals**

Show-Me Standards: MA1, MA5	MO Grade Level Expectations: N2D10, N3B9, N3D10	NCTM Standards: 2A, 3A

OBJECTIVE: Students will be able to solve problems using basic operations with decimals.

Introduction:
Decimal numbers are a standard practice in every aspect of our lives and work. The use of decimals is important in communication of fractions. The definition of a decimal can be stated as the portion of the whole amount available, added, or reduced. In like fashion a fraction is defined as a portion of the whole amount. Thus, decimals and fractions are similar. There are three ways that decimals are written: ***Decimal Fraction***; ***Decimal Number***, or ***Decimal***. Other important items in dealing with decimals are:

- **Decimal System** – the system of numbers where each digit is assigned a value that is a multiple of 10 depending on the place or location of the digit in the complete number.
- **Digits** – any of the numerals 0 to 9 used to express a complete number.
- **Decimal Point** – the place where the complete number separates between a whole number and a fraction of a whole number. Thus, all decimal numbers can be expressed in terms of the total amount of wholes plus the fraction of a whole. **NOTE:** Numbers written without a decimal point are called whole numbers (or integers) – in these numbers the decimal point is assumed to come to the right of the last number.
- **Place Values** – the value of the location of a digit in a complete number. The place value determines the value of the digit.
- **Significant Figures** – are the figures of a number that begin with the first nonzero figure to the left and with the last figure to the right that is not zero, or is a zero.
- **Rounding** – is giving a close approximation of a number.

WHERE TO BEGIN:
- When working with decimal numbers it is **VERY IMPORTANT** to align the decimal points prior to completing any operations on the numbers. Example:

Good Form	*Poor Form*
12.345 + 9.85	12.345 + 9.85
126.487 - 9.1269	126.487 - 9.1269
12.5983 x 9.423	12.5983 x 9.423

- In multiplication of decimals, the answer will have the number of decimal places equal to the sum of the decimal places of the numbers being multiplied.

- In division of decimals, the decimal place is moved in the divisor so that a whole number is divided into the dividend – ***REMEMBER***, the decimal place must be moved an equal number of spaces in the dividend at the same time. After movement is complete, the decimal point is copied directly above the place it appears in the dividend and then division is completed.

📖 Items to remember regarding a complete numbers "significant numbers":
- o Significant digits are counted in consecutive place from left to right.
- o All nonzero numbers are significant.
- o Zeroes are significant if they are between two nonzero digits.
- o Zeroes to the right of a number and to the right of the decimal point are significant.
- o Zeroes to the left of a number are not significant.
- o Zeroes to the right of a number and without a decimal point are not significant.
- o If a measured decimal number is multiplied or divided by a whole number, the measured number of significant figures is normally counted.
- o Most answers are recorded with the least number of significant digits.

📖 Rounding Answers in another important step in working with decimal numbers. The rules for rounding are:
- o Determine the number of significant digits.
- o All digits to the right of the rounding number – the number that will determine if the last digit is increased, or decreased, are dropped off.
- o If the digit to the right of the last significant digit is five (5) or greater, then the last digit is increased by one. If the digit to the right of the last significant digit is less than five (5) then the digit remains the same.

PROBLEMS:

1.) $12.78 + 4.56$ 2.) $127.86 - 8.93$ 3.) $27.1983 + 9.302$ 4.) $8.375 - 6.0092$

5.) $9.502 * 6.25$ 6.) $10.75" \times 3.5"$ 7.) $9.25" * 6$ 8.) $16.215' \times 8.402'$

9.) $2.5 \div 4$ 10.) $10 \div 2.5$ 11.) $125.75" / 5.5"$ 12.) $\dfrac{55.75'}{2.5'}$

WORD PROBLEMS:

1. A piece of carpet for your day care facility measures 144.50 inches in length and 48 inches in width. The length is to be cut into 18 inch pieces for use as play areas for the children. How many pieces will be cut from the original piece of carpet? (NOTE: Answer should be in a decimal form.)

2. In building a piece of machinery, there are three parts manufactured that are welded together, one on top of the other, with no loss of length. If the three parts are 12.75 ft., 23.50 ft. and 21.25 ft., what is the height of the machine?

3. A sheet metal technician at an automotive collision and repair shop needs to cut an 88.75 ft. piece of steel into 9 equal sections. How long will each section be after they are cut figuring there is no loss of material for cutting?

4. A patient needs to be administered a medicine based on 0.25 mg. Per pound of body weight. If the patient weighs 178 lbs., how much medicine does the patient need to be administered?