MA 4A	**Mathematics Embedded Credit**
Cape Career & Technology Center	**Last Update: April 2017**
Topic: Ratio and Proportion	**Focus: Write and Interpret**

Show-Me Standards: MA5, MA6	**MO Grade Level Expectations:** **N3E10, N3E8, N2D9**	**NCTM Standards: 2A, 3A**

OBJECTIVE: Students will be able to write and interpret basic ratios and proportions.

Introduction:
There are three important words related to the subject of 'Ratios and Proportions'.

- **RATIO:** the expression of a relationship between two or more numbers using division.
  - **Can Be WRITTEN:**   A to B; A:B; or A/B – all of these forms are equal. Fractions are the most common way that ratios are written.
  - **"Same Ratio, Different Expression":** The same ratio can be expressed many different ways: $\dfrac{1}{2} = \dfrac{2}{4} = \dfrac{3}{6} = \dfrac{4}{8} = \dfrac{5}{10} = \dfrac{15}{30}, etc.$

- **PROPORTION:** the comparison of two equal ratios that are expressed with different numbers.
  - **Can Be WRITTEN:** $\dfrac{a}{b} = \dfrac{c}{d}$, or $a:b::c:d$
  - **Be CAREFUL:** Units of measure in one ratio should always be written exactly the same as the units in the other ratio.
  - **EXAMPLES:** $\dfrac{dollars}{hour} = \dfrac{dollars}{hour}, \dfrac{miles}{gallon} = \dfrac{miles}{gallon}, \dfrac{cents}{pound} = \dfrac{cents}{pound}$
  - **"Cross Multiplication":** The method used to transpose numbers in a proportion. Cross multiplication removes the division from an equation. To cross multiply, multiply each denominator by the opposite numerator; the equate the two products. $\dfrac{a}{b} = \dfrac{c}{d} = (a*d = b*c)$

- **VARIATION:** an equation that relates one variable to one or more other variables.

PROBLEMS:

1. Use the following relationship to complete the table: The length of rectangle is 4 times its width.

Length (feet)	Width (feet)
6	
	3
2.5	
8	
	6.5

2. Use the following relationship to complete the table: The speed of Car #1 is 15 miles per hour faster than Car #2.

Car#1 (mph)	Car #2 (mph)
65	
	35
25	
80	
	65

3. There is a pile of lumber containing boards that are 8' and 10' in length. Total there are 48 boards. Complete the table using this information.

8-footers (quantity)	10-footers (quantity)
6	
	18
25	
8	
	28

4. For Question #1, what is the ratios of Width (feet) to Length (feet) written in this form: **a:b**.

5. For Question #2, what is the ratios of Car#1 (mph) to Car #2 (mph) written in this form: **a/b**.

6. For Question #3, what is the ratios of 10-footers to 8-footers written in this form: **a to b**.