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| **Type POS Math descriptor here** | **=** | **Use units as a way to understand problems and to guide the****solution of multi‐step problems** |
| **Program Task:** **:** Enter POS task here | **PA Core Standard:** CC.2.1.HS.F.4 **Description:** Use units as a way to understand problems and to guide the solution of multi-step problems |
| **Program Associated Vocabulary:**ENTER PROGRAM AREA VOCABULARY HERE | **Math Associated Vocabulary:**RATE, DECIMAL, RATIO, DIMENSIONAL/UNIT ANALYSIS |
| **Program Formulas and Procedures:**Display program example of math concept by entering text, graphic, and formulas in this column. | **Formulas and Procedures:**Dimensional Analysis (using math to move from one unit to another) can be used to solve problems using operations because by analyzing the units, one can determine whether or not the equation was set up correctly. **Basic Steps:**1. Determine the unit given and the unit needed (answer).
2. Write the number with the unit you are given as a fraction over one on the left hand side and write an equal sign followed by the unit you need on the far right hand side.
3. Multiply by the rates you are given or conversion factors (write as fractions), making sure that the unit that was given (in numerator) is also on the bottom (denominator) of the given rate or conversion factor.
4. Remember, units cancel out just like numbers do! Continue to multiply by rates or conversion factors until the unit needed is the only unit that does not cancel.
5. Perform the indicated operations.

**Example:** A snail can crawl 13 feet in 2.5 hours. How far can it crawl in 240 minutes?1. unit given = 240 minutes, unit needed = feet
2. = feet
3. = feet
4. = feet
5.

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| **Instructor's Script – Comparing and Contrasting**The Math or program area instructor should fill in this area by comparing academic math problems to lab area problems. The teacher should describe ways that trade math is similar to or different from the academic math that occurs in the PA Core Math standard or on Keystone related exams.  |

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| **Common Mistakes Made By Students****Use of incorrect conversion factors or omission of essential conversion factors:**For instance, in the problem shown below, a conversion factor (60 minutes = 1 hour) was omitted from the solution.What is 60 miles per hour in feet per second?**Incorrectly setting up the problem:**For instance, in the problem shown below, the problem has been set up incorrectly. Instead of starting with the 60 miles per hour, the solution begins with the conversion factor. What is 60 miles per hour in feet per second? |

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| **CTE Instructor’s Extended Discussion**The CTE instructor may add comments here describing the importance of this math skill in relationship to the program task, or note common problems which students have when making the computations. |

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| **Problems Career and Technical Math Concepts Solutions** |
| 1. Program relevant problem
 | Allow work space here |
| 1. Program relevant problem
 | Allow work space here |
| 1. Program relevant problem
 | Allow work space here |
| **Problems Related, Generic Math Concepts Solutions** |
| 1. One milliliter of ink can print 50 pages of text. If you have 10 gallons, how many pages can you print? (1 gallon = 3.79 L)
 |  |
| 1. Sandy is traveling at 97 km. on 102 minutes. What is her speed in miles per hour if 1 mile = 1.6 km.?
 |  |
| 1. A worker unloads 9 crates every 36 minutes and is paid $2 per crate. How much money does he make in an 8 hour shift?
 |  |
| **Problems PA Core Math Look Solutions** |
| 1. Kathy and John are helping to create party favors for the school dance. Kathy can create 30 in one hour and John can create 40 in two hours. At that rate, how long will it take to create 500 party favors?
 |  |
| 1. Two trucks are plowing snow and moving in opposite directions. The first truck can plow snow at 23 mph and the other can plow at 17 mph. How long will it take them to plow 200 miles of road?
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| 1. A car gets 35 miles per gallon of gas. If the cost of gas is $3.97 per gallon, how much will it cost to make a 485 mile trip?
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| **Problems Career and Technical Math Concepts Solutions** |
| 1. Program relevant problem
 | Provide answer here |
| 1. Program relevant problem
 | Provide answer here |
| 1. Program relevant problem
 | Provide answer here |
| **Problems Related, Generic Math Concepts Solutions** |
| 1. One milliliter of ink can print 50 pages of text. If you have 10 gallons, how many pages can you print? (1 gallon = 3.79 L)
 |  = 1,895,000 pages |
| 1. Sandy is traveling at 97 km. on 102 minutes. What is her speed in miles per hour if 1 mile = 1.6 km.?
 | = 35 miles per hour |
| 1. A worker unloads 9 crates every 36 minutes and is paid $2 per crate. How much money does he make in an 8 hour shift?
 |  |
| **Problems PA Core Math Look Solutions** |
| 1. Kathy and John are helping to create party favors for the school dance. Kathy can create 30 in one hour and John can create 40 in two hours. At that rate, how long will it take to create 500 party favors?
 |  total rate =  |
| 1. Two trucks are plowing snow and moving in opposite directions. The first truck can plow snow at 23 mph and the other can plow at 17 mph. How long will it take them to plow 200 miles of road?
 | Rate 1 + Rate 2 = 23mph + 17mph = 40 mph |
| 1. A car gets 35 miles per gallon of gas. If the cost of gas is $3.97 per gallon, how much will it cost to make a 485 mile trip?
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