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| **Type POS Math descriptor here** | **=** | | **Explain volume formulas and use them to solve problems** |
| **Program Task:** Enter POS task here. | | **PA Core Standard: CC.2.3.HS.A.12**  **Description:** Explain volume formulas and use them to solve problems. | |
| **Program Associated Vocabulary:**  ENTER PROGRAM VOCABULARY HERE | | **Math Associated Vocabulary:**  AREA, VOLUME, LENGTH, WIDTH, HEIGHT, RECTANGULAR, ROUND, CYLINDRICAL, BASE, RADIUS, RECTANGULAR PRISM | |
| **Program Formulas and Procedures:**  Display program example of math concept by entering text, graphic, and formulas in this column. | | **Formulas and Procedures:**  **Volume:**    **Cylinder**:  V = πr2h    **Cone:**  V = 1/3πr2h    **Rectangular Prism:**  V = lwh    **Sphere:**  V = 4/3πr3    **Pyramid:**  V =1/3 (area of the base)h  h = height b = base  l = slant length or slant height  **Example:**  How many cubic inches of air can a beach ball hold if it has a diameter of 14 inches? Round to the nearest whole number.  **Steps to finding volume:**   1. Identify the solid. (sphere) 2. Write the formula for calculating the volume of that solid using the formula sheet.   V = 4/3πr3   1. Identify what information you are given in the example.   Given: diameter (d) = 14”   1. Solve for radius using the formula radius (r) = ½ (diameter).   r = ½ x 14 = 7   1. Perform the necessary mathematical operations to obtain your answer.   V = 4/3πr3 = 4/3(3.14)(73) = 1,436 in3   1. Write the appropriate unit after your answer.   1,436 in3 | |

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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 instructor should describe ways that career and technical program math is similar 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**  **Students may use an incorrect formula to solve a problem**: To rectify these errors have the students correctly identify the type of object they are dealing with and use the appropriate formula. Frequently two formulas may be needed for complex problems.  **Using consistent units**: If the problem asks for the answer in square feet instead of square inches, be sure to either convert your given measurements into feet first (inches ÷ 12 = feet) or convert your square inch answer into square feet (sq. inches ÷ 144 = sq. feet). |

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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 soup can has a d = 3” and h = 4”; another soup can has a d = 4” and h = 3”. Which can holds more soup? |  |
| 1. A size 7 regulation basketball has a d = 9.39”. What is the volume of the basketball? |  |
| 1. How much water would you need to fill a rectangular fish tank with a height of 16.5”, a length of 32”, and a width of 8.5”? |  |
| **Problems PA Core Math Look Solutions** | |
| 1. Find the volume of a cylinder if d = 12.5’ and h = 28.45’. Round your answer to the nearest thousandth. |  |
| 1. Find the volume of a sphere if d = 27.75”. Round your answer to the nearest hundredth. |  |
| 1. Find the volume of a pyramid with a square base with sides of 10”and a height of 25”. |  |

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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 soup can has a d = 3” and h = 4”; another soup can has a d = 4” and h = 3”. Which can holds more soup? |  |
| 1. A size 7 regulation basketball has a d = 9.39”. What is the volume of the basketball? |  |
| 1. How much water would you need to fill a rectangular fish tank with a height of 16.5”, a length of 32”, and a width of 8.5”? | V =(32)(8.5)(16.5)= 4,488 in3 |
| **Problems PA Core Math Look Solutions** | |
| 1. Find the volume of a cylinder if d = 12.5’ and h = 28.45’. Round your answer to the nearest thousandth. |  |
| 1. Find the volume of a sphere if d = 27.75”. Round your answer to the nearest hundredth. |  |
| 1. Find the volume of a pyramid with a square base with sides of 10”and a height of 25”. |  |