TECHNICAL MATH Course Units of Study

The Technical Math course features five units of instruction and a capstone project. This document clearly articulates the premise of each unit of study; the recommended period for instruction; and a list of the key performance indicators that are included in the units. Key performance indicators are coded as **major** areas of focus for the unit (green) or **supporting** (blue).

Units	Competencies/Performance Indicators
Unit 1: Agriculture, Food & Natural Resources (AFNR) *Students will work through different lessons focusing on Agriculture, Culinary Arts, and Natural resources. These lessons will give students a background knowledge and aspects of different careers within this cluster. The lessons will guide the students to their Summative Task of Planning a Farm to Table Event.* *Students not interested in the Career Cluster will now have a better understanding of their food purchases and their impact on the environment.*	TM-NS1-A. Analyze proportional relationships and use them to solve contextualized and mathematical problems.
	TM-NS1-B. Compute unit rates associated with ratios of fractions, decimals, and percents and including ratios of lengths, areas and other quantities measured in like or different units.
	TM-NS1-C. Apply properties of operations to calculate with numbers in any form including signed numbers.
	TM-NS1-E. Assess the reasonableness of answers using mental computation and estimation and rounding strategies.
	TM-NS2-C Use ratio reasoning (dimensional analysis) to convert measurement units including, but not limited to, distances and rates.
	TM-NS3-A. Evaluate expressions at specific values for their variables. Include expressions that arise from formulas in authentic problems.
	TM-NS4-A. Draw conclusions and justify those conclusions from graphics such as order forms, bar charts, pie charts, diagrams, flow charts, maps, and dashboards.
	TM-NS4-B. Identify and interpret trends, patterns, and relationships from graphs and charts.
	TM-NS4-C. Identify types of graphs that best represent a given set of data.

5 weeks/1125 minutes	TM-NS4-D. Make and justify decisions based on data.
	TM-BA1-A. Use properties of operations to generate equivalent expressions.

Unit 2: **Health Sciences** *Students will work through a series of case studies each concentrating on different applications of math within Health Occupations.* *These case studies can be done in different order if needed.* *Students who are not interested in this Career Cluster can now have a better understanding how health care providers make decisions about their personal health.* 3 weeks/675 minutes	TM-NS1-A. Analyze proportional relationships and use them to solve contextualized and mathematical problems.
	TM-NS1-B. Compute unit rates associated with ratios of fractions, decimals, and percents and including ratios of lengths, areas and other quantities measured in like or different units.
	TM-NS1-D. Convert between forms as appropriate.
	TM-NS2-A Convert like measurement units within a given measurement system and between systems.
	TM-NS2-B Convert among different sized standard and/or metric measurement units and use these conversions in solving authentic multistep problems.
	TM-NS2-C Use ratio reasoning (dimensional analysis) to convert measurement units including, but not limited to, distances and rates.
	TM-NS3-A. Evaluate expressions at specific values for their variables. Include expressions that arise from formulas in authentic problems.
	TM-NS4-A. Draw conclusions and justify those conclusions from graphics such as order forms, bar charts, pie charts, diagrams, flow charts, maps, and dashboards.
	TM-NS4-B. Identify and interpret trends, patterns, and relationships from graphs and charts.
	TM-NS4-D. Make and justify decisions based on data.
	TM-G2-D. Represent applied problems by graphing points in the coordinate plane and interpret coordinate values of points in the context of the situation.
	TM-BA3-C. Choose and interpret units consistently in formulas.
	TM-BA3-D. Apply appropriate formulas to solve applications.

Unit 3: **Human and Public Services** *Students will work through lessons that show them how Crime Scene Investigators use math to solve problems. The lessons will guide students to their Summative Task of determining Whodunit. Students who are not interested in this Career cluster can now follow along with their favorite TV crime series.* 5 weeks/1125 minutes	TM-NS1-C. Apply properties of operations to calculate with numbers in any form including signed numbers.
	TM-NS1-F. Use rational approximations of irrational numbers to compare the size of irrational numbers and estimate the value of expressions (e.g., π/2).
	TM-NS2-A Convert like measurement units within a given measurement system and between systems.
	TM-NS3-A. Evaluate expressions at specific values for their variables. Include expressions that arise from formulas in authentic problems.
	TM-NS3-B. Perform arithmetic operations, including those involving whole-number exponents, using order of operations.
	TM-NS3-C. Work with radicals and integer exponents.
	TM-NS3-E. Evaluate square roots of small perfect squares and cube roots of small perfect cubes.
	TM-NS3-F. Know that square roots and cubed roots of non-perfect squares and cubes are irrational and understand what irrational numbers are.
	TM-G2-A. Use facts about supplementary, complementary, vertical, adjacent, corresponding, alternate interior, and alternate exterior angles to solve for an unknown angle.
	TM-G2-D. Represent applied problems by graphing points in the coordinate plane and interpret coordinate values of points in the context of the situation.
	TM-G3-A. Use the Pythagorean Theorem to solve for the length of a leg or the hypotenuse of right triangles.
	TM-G3-B. Use right triangle ratios (sine, cosine, tangent, and their inverses) to solve for unknown sides and angles in right triangles.
	TM-BA1-C. Solve linear equations and inequalities in one variable.

	TM-BA1-D. Use linear equations to model authentic contexts.
	TM-BA2-A. Use variables to represent two quantities involving geometric figures that change in relationship to one another.
	TM-BA2-B. Write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable.
	TM-BA2-C. Rearrange formulas to highlight a quantity of interest using the same reasoning as in solving equations.
	TM-BA3-A. Evaluate expressions, including those that arise from formulas in authentic problems, at specific values for their variables.
	TM-BA3-C. Choose and interpret units consistently in formulas.
	TM-BA3-D. Apply appropriate formulas to solve applications.

Unit 4: **METT - Trades** *The students will work through 2 different construction assignments seeing how math is used in determining how things are built, designed, costs, and process. This unit will give students two different opportunities to apply some math skills for their final project. Students not interested in this Career Cluster will now be able to make better homeowner decisions in their future.* 6 weeks/1350 minutes Roofing: 3 weeks/675 minutes Kitchen Design: 3 weeks/675 minutes	TM-NS1-E. Assess the reasonableness of answers using mental computation and estimation and rounding strategies.
	TM-NS1-F. Use rational approximations of irrational numbers to compare the size of irrational numbers and estimate the value of expressions (e.g., π/2).
	TM-NS2-B Convert among different sized standard and/or metric measurement units and use these conversions in solving authentic multistep problems.
	TM-NS2-D Manipulate and transform units appropriately when multiplying or dividing quantities.
	TM-NS3-C. Work with radicals and integer exponents.
	TM-NS3-D. Use square root and cube root symbols to represent solutions to equations of the form x^2 = p and x^3 = p, where p is a positive rational number.
	TM-NS3-E. Evaluate square roots of small perfect squares and cube roots of small perfect cubes.
	TM-NS3-F. Know that square roots and cubed roots of non-perfect squares and cubes are irrational and understand what irrational numbers are.
	TM-NS4-C. Identify types of graphs that best represent a given set of data.
	TM-G1-A. Use perimeter, area, and volume formulas to calculate measurements of geometric figures.
	TM-G2-A. Use facts about supplementary, complementary, vertical, adjacent, corresponding, alternate interior, and alternate exterior angles to solve for an unknown angle.
	TM-G2-B. Accurately measure parts of geometric figures such as sides, perimeter, circumference, diagonals, diameter, and angles using the correct measurement tool.
	TM-G2-C. Solve problems involving scale drawings of geometric figures including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.

TM-G2-D. Represent applied problems by graphing points in the coordinate plane and interpret coordinate values of points in the context of the situation.
TM-BA1-A. Use properties of operations to generate equivalent expressions.
TM-BA1-B. Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
TM-BA2-A. Use variables to represent two quantities involving geometric figures that change in relationship to one another.
TM-BA3-A. Evaluate expressions, including those that arise from formulas in authentic problems, at specific values for their variables.
TM-BA3-B. Reason quantitatively and use units to solve problems as a way to understand problems and to guide the solution of multistep problems.
TM-BA3-C. Choose and interpret units consistently in formulas.
TM-BA3-D. Apply appropriate formulas to solve applications.
ROOFING
TM-NS1-E. Assess the reasonableness of answers using mental computation and estimation and rounding strategies.
TM-NS1-F. Use rational approximations of irrational numbers to compare the size of irrational numbers and estimate the value of expressions (e.g., π/2).
TM-NS2-D Manipulate and transform units appropriately when multiplying or dividing quantities.

	TM-NS3-A. Evaluate expressions at specific values for their variables. Include expressions that arise from formulas in authentic problems.
	TM-NS3-B. Perform arithmetic operations, including those involving whole-number exponents, using order of operations.
	TM-NS3-C. Work with radicals and integer exponents.
	TM-G1-A. Use perimeter, area, and volume formulas to calculate measurements of geometric figures.
	TM-G2-A. Use facts about supplementary, complementary, vertical, adjacent, corresponding, alternate interior, and alternate exterior angles to solve for an unknown angle.
	TM-G3-A. Use the Pythagorean Theorem to solve for the length of a leg or the hypotenuse of right triangles.
	TM-G3-B. Use right triangle ratios (sine, cosine, tangent, and their inverses) to solve for unknown sides and angles in right triangles.
	TM-BA3-C. Choose and interpret units consistently in formulas.
	TM-BA3-D. Apply appropriate formulas to solve applications.

Unit 5 **METT: Manufacturing** *Students will go through some different manufacturing tasks looking at packaging design, ISO Quality Control, Assembly line, quoting, packaging, trouble shooting. The summative will put the student as a consultant for a company who will be making recommendations to improve the company's production and reduces the cost.* 5 weeks/1125 minutes	TM-NS1-A. Analyze proportional relationships and use them to solve contextualized and mathematical problems.
	TM-NS1-C. Apply properties of operations to calculate with numbers in any form including signed numbers.
	TM-NS1-D. Convert between forms as appropriate.
	TM-NS1-E. Assess the reasonableness of answers using mental computation and estimation and rounding strategies.
	TM-NS1-F. Use rational approximations of irrational numbers to compare the size of irrational numbers and estimate the value of expressions (e.g., π/2).
	TM-NS2-A Convert like measurement units within a given measurement system and between systems.
	TM-NS2-B Convert among different sized standard and/or metric measurement units and use these conversions in solving authentic multistep problems.
	TM-NS2-D Manipulate and transform units appropriately when multiplying or dividing quantities.
	TM-NS3-A. Evaluate expressions at specific values for their variables. Include expressions that arise from formulas in authentic problems.
	TM-NS3-B. Perform arithmetic operations, including those involving whole-number exponents, using order of operations.
	TM-NS3-D. Use square root and cube root symbols to represent solutions to equations of the form x^2 = p and x^3 = p, where p is a positive rational number.
	TM-NS3-F. Know that square roots and cubed roots of non-perfect squares and cubes are irrational and understand what irrational numbers are.

	TM-NS4-D. Make and justify decisions based on data.
	TM-G1-A. Use perimeter, area, and volume formulas to calculate measurements of geometric figures.
	TM-G2-A. Use facts about supplementary, complementary, vertical, adjacent, corresponding, alternate interior, and alternate exterior angles to solve for an unknown angle.
	TM-G2-B. Accurately measure parts of geometric figures such as sides, perimeter, circumference, diagonals, diameter, and angles using the correct measurement tool.
	TM-G2-C. Solve problems involving scale drawings of geometric figures including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.
	TM-BA1-A. Use properties of operations to generate equivalent expressions.
	TM-BA1-B. Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
	TM-BA1-C. Solve linear equations and inequalities in one variable.
	TM-BA2-A. Use variables to represent two quantities involving geometric figures that change in relationship to one another.
	TM-BA2-B. Write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable.
	TM-BA2-C. Rearrange formulas to highlight a quantity of interest using the same reasoning as in solving equations.
	TM-BA3-B. Reason quantitatively and use units to solve problems as a way to understand problems and to guide the solution of multistep problems.

	TM-BA3-C. Choose and interpret units consistently in formulas.
	TM-BA3-D. Apply appropriate formulas to solve applications.

CAPSTONE PROJECT - Workplace Design *Students will create an ideal workspace for themselves in their desired career field. This will be a personalized task but every student will have common sections in their tasks. Students will need to research space and size, equipment, materials, and layout of workspaces. They will create a scale model of their workspace and a cost list of the materials and equipment. Students will need to support all choices for their workplace.* **9 weeks** Entire 4 quarter of school year *Map your school's calendar and senior obligations during 4th quarter to make due dates and adjust timing of this unit.	TM-NS1-A. Analyze proportional relationships and use them to solve contextualized and mathematical problems.
	TM-NS1-C. Apply properties of operations to calculate with numbers in any form including signed numbers.
	TM-NS1-D. Convert between forms as appropriate.
	TM-NS1-E. Assess the reasonableness of answers using mental computation and estimation and rounding strategies.
	TM-NS2-A Convert like measurement units within a given measurement system and between systems.
	TM-NS2-B Convert among different sized standard and/or metric measurement units and use these conversions in solving authentic multistep problems.
	TM-NS2-C Use ratio reasoning (dimensional analysis) to convert measurement units including, but not limited to, distances and rates.
	TM-NS2-D Manipulate and transform units appropriately when multiplying or dividing quantities.
	TM-NS3-A. Evaluate expressions at specific values for their variables. Include expressions that arise from formulas in authentic problems.
	TM-NS3-B. Perform arithmetic operations, including those involving whole-number exponents, using order of operations.
	TM-NS4-D. Make and justify decisions based on data.
	TM-G1-A. Use perimeter, area, and volume formulas to calculate measurements of geometric figures.
	TM-G2-A. Use facts about supplementary, complementary, vertical, adjacent, corresponding, alternate

	interior, and alternate exterior angles to solve for an unknown angle.
	TM-G2-B. Accurately measure parts of geometric figures such as sides, perimeter, circumference, diagonals, diameter, and angles using the correct measurement tool.
	TM-G2-C. Solve problems involving scale drawings of geometric figures including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.
	TM-G3-A. Use the Pythagorean Theorem to solve for the length of a leg or the hypotenuse of right triangles.
	TM-BA1-A. Use properties of operations to generate equivalent expressions.
	TM-BA1-B. Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
	TM-BA1-C. Solve linear equations and inequalities in one variable.
	TM-BA1-D. Use linear equations to model authentic contexts.
	TM-BA2-A. Use variables to represent two quantities involving geometric figures that change in relationship to one another.
	TM-BA2-B. Write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable.
	TM-BA3-A. Evaluate expressions, including those that arise from formulas in authentic problems, at specific values for their variables.
	TM-BA3-B. Reason quantitatively and use units to solve problems as a way to understand problems and to guide the solution of multistep problems.

	TM-BA3-C. Choose and interpret units consistently in formulas.
	TM-BA3-D. Apply appropriate formulas to solve applications.