

CURRICULUM MAP

Math III-Ohio Valley Career & Technical Center

August/September	October	November/December
<p>Number, Number Sense, & Operations 8. Use fractional and negative exponents as optional ways of representing and finding solutions for problem situation. (Chapter 1.4-1.8)</p> <p>Patterns, Functions, & Algebra 1. Identify and describe problem situations involving an iterative process that can be represented as a recursive function; e.g., compound interest. 2. Translate a recursive function into a closed form expression or formula for the nth term to solve a problem situation involving an iterative process; e.g., find the value of an annuity after 7 years. 11. Add, subtract, multiply, and divide monomials and polynomials. 12. Simplify rational expressions by eliminating common factors and applying properties of integer exponents.</p> <p>Data Analysis & Probability 1. Design a statistical experiment, survey, or study for a problem; collect data for the problem; and interpret the data with appropriate graphical displays, descriptive statistics, concepts of variability, causation, correlation, and standard deviation. 2. Describe the role of randomization in a well-designed study, especially as compared to a convenience sample, and the generalization of results from each. 3. Describe how a linear transformation of univariate data affects range, mean, mode, and median. (Chapter 2)</p>	<p>Measurement 1. Determine the number of significant digits in a measurement. 2. Use radian and degree angle measures to solve problems and perform conversions as needed. 3. Derive a formula for the surface area of a cone as a function of its slant height and the circumference of its base. 4. Calculate distances, areas, surface areas and volumes of composite three-dimensional objects to a specified number of significant digits. 5. Solve real-world problems involving area, surface area, volume, and density to a specified degree of precision. (Chapters 3.1-3.4, 4, and 5)</p>	<p>Geometry & Spatial Sense 1. Use polar coordinates to specify locations on a plane. 4. Use trigonometric relationships to determine lengths and angle measures; i.e., Law of Sines and Law of Cosines. 5. Identify, sketch, and classify the cross sections of three-dimensional objects.</p> <p>Data Analysis & Probability 4. Create a scatterplot of bivariate data, identify trends, and find a function to model the data. (Chapters 6.1-6.3, 7, and 14)</p>

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January/February	March	March/April
<p>Number, Number Sense, & Operations</p> <ol style="list-style-type: none"> Determine what properties hold for matrix addition and matrix multiplication; e.g., use examples to show addition is commutative and when multiplication is not commutative. Determine what properties hold for vector addition and multiplication, and for scalar multiplication. Use matrices to represent given information in a problem situation. Model, using the coordinate plane, vector addition and scalar multiplication. Compute sums, differences, and products of matrices using paper and pencil calculations for simple cases, and technology for more complicated cases. Use vector addition and scalar multiplication to solve problems. <p>Patterns, Functions, & Algebra</p> <ol style="list-style-type: none"> Model and solve problems with matrices. Solve 3 by 3 systems of linear equations by elimination and using technology, and interpret graphically what the solution means (a point, line, plane, or no solution). <p>Geometry & Spatial Sense</p> <ol style="list-style-type: none"> Represent translations using vectors. Describe multiplication of a vector and a scalar graphically and algebraically, and apply to problem situations. <p>(Chapters 6.4-6.8 and 8)</p>	<p>Data Analysis & Probability</p> <ol style="list-style-type: none"> Use technology to find the Least Squares Regression Line, the regression coefficient, and the correlation coefficient for bivariate data with linear trend, and interpret each of these statistics in the context of the problem situation. Use technology to compute the standard deviation for a set of data, and interpret standard deviation in relation to the context or problem situation. Describe the standard normal curve and its general properties, and answer questions dealing with data assumed to be normal. Analyze and interpret univariate and bivariate data to identify patterns, note trends, draw conclusions, and make predictions. Evaluate validity of results of a study based on characteristics of the study design, including sampling method, summary statistics and data analysis techniques. Understand and use the concept of random variable, and compute and interpret the expected value for a random variable in simple cases. Examine statements and decisions involving risk; e.g., insurance rates and medical decisions. <p>(Chapter 9)</p>	<p>Patterns, Functions, & Algebra</p> <ol style="list-style-type: none"> Describe and compare the characteristics of the following families of functions: quadratics with complex roots, polynomials of any degree, logarithms, and rational functions; e.g., general shape, number of roots, domain and range, asymptotic behavior. Identify the maximum and minimum points of polynomial, rational and trigonometric functions graphically and with technology. Identify families of functions with graphs that have rotation symmetry or reflection symmetry about the y-axis, x-axis, or $y=x$. Represent the inverse of a function symbolically and graphically as a reflection about $y=x$. Solve equations involving radical expressions and complex roots. Describe the characteristics of the graphs of the conic sections. Describe how a change in the value of a constant in an exponential, logarithmic or radical equation affects the graph of the equation. <p>Number, Number Sense, & Operations</p> <ol style="list-style-type: none"> Represent complex numbers on the complex plane. Compute sums, differences, products, and quotients of complex numbers. <p>(Chapter 10, 11, 12, and 13)</p>

Benchmarks

Mathematical Processes Standard

Students use mathematical processes and knowledge to solve problems. Students apply problem-solving and decision-making techniques, and communicate mathematical ideas. The benchmarks for mathematical processes articulate what students should demonstrate in problem solving, representation, communication, reasoning, and connections at key points in their mathematics program. Specific grade-level indicators have not been included for the mathematical processes standard because content and processes should be interconnected at the indicator level. Therefore, mathematical processes have been embedded within the grade-level indicators for the five content standards.

By the end of the 11-12 program:

- A. Construct algorithms for multi-step and non-routine problems.
- B. Construct logical verifications or counter-examples to test conjectures and to justify or refute algorithms and solutions to problems.
- C. Assess the adequacy and reliability of information available to solve a problem.
- D. Select and use various types of reasoning and methods of proof.
- E. Evaluate a mathematical argument and use reasoning and logic to judge its validity.
- F. Present complete and convincing arguments and justifications, using inductive and deductive reasoning, adapted to be effective for various audiences.
- G. Understand the difference between a statement that is verified by mathematical proof, such as a theorem, and one that is verified empirically using examples or data.

By the end of the 11-12 program:

- H. Use formal mathematical language and notation to represent ideas, to demonstrate relationships within and among representation systems, and to formulate generalizations.
- I. Communicate mathematical ideas orally and in writing with a clear purpose and appropriate for a specific audience.
- J. Apply mathematical modeling to workplace and consumer situations, including problem formulation, identification of a mathematical model, interpretation of solution within the model, and validation to original problem situation.