SAU 16 MATH LEARNING PROGRESSION
Graduation Competencies

Symbolic Expression
Students will reason abstractly and manipulate symbolic expressions and models to represent relationships and interpret expressions, equations, and inequalities in terms of a given context (including real-world phenomena) for determining unknown values.

Numbers and Number Systems
Students will expand their understanding of number systems, thinking flexibly and attending to precision and reasonableness, when solving problems using complex numbers.

Reasoning and Computational Strategies
Students will expand the use of computational strategies and algorithms, using evidence to support authentic application.

Metacognitive Skills and Communication
Students will use reasoning and metacognitive skills to develop mathematical arguments to justify the reasonableness of conjectures and outcomes and to support formal proofs.

Measurement
Students will explain reasoning when applying and modeling geometric measurement formulas.

Algebraic Functions, Patterns, and Relations
Students will make use of patterns, relations, and functions to interpret, compare, and analyze pure and applied situations, using the information to make conjectures and support conclusions.

Geometry
Students will solve problems involving spatial reasoning using properties of 2- and 3-dimensional figures to analyze, represent, and model geometric relationships in pure/theoretical and authentic, applied contexts.

Data Analysis, Probability, and Statistics
Students will apply statistical methods and reasoning to summarize, represent, analyze, and interpret categorical and quantitative data, including addressing authentic*, applied scenarios. Students will apply the rules of probability to determine the likelihood of a given outcome or to make decisions.

Grade 6 Math Learning Progressions Toward Graduation Competencies	
GRADUATION STRAND	**GRADE LEVEL COMPETENCY**
Symbolic Expression	Students will reason abstractly and quantitatively, recognizing and making appropriate use of mathematical symbols and expressions for a variety of purposes, including variables. Students will reason abstractly and manipulate symbolic expressions to represent relationships and interpret expressions and equations in terms of a given context for determining an unknown value.
Numbers and Number Systems	Students will demonstrate an understanding of number systems, thinking flexibly and attending to precision and reasonableness when solving problems using whole numbers, fractions, and decimals.
Reasoning and Computational Strategies	Students will apply additive, multiplicative, and fractional reasoning using multiple strategies (algorithms, models, manipulatives) to solve authentic applied problems
Metacognitive Skills and Communication	Students will use reasoning and self- monitoring to analyze and justify one or more solution pathways. Students will use reasoning and metacognitive skills* through making conjectures, justifying, and communicating mathematical solutions and arguments. Students will use reasoning and metacognitive skills through making conjectures, justifying, and effectively* communicating mathematical solutions and arguments.
Measurement	Students will use tools and apply precision and reasoning to solve measurement problems authentic applied contexts. Students will strategically use tools and apply proportional reasoning and precision to solve measurement problems in pure/theoretical and authentic applied contexts.
Algebraic Functions, Patterns,	Students will make use of structure to describe and compare

and Relations	situations that involve change or patterns and use the information to make conjectures and justify conclusions/solutions.
Geometry	Students will solve problems involving reasoning using properties of 2- and 3- dimensional shapes to analyze, represent, and model geometric relationships in pure/theoretical and authentic applied contexts.
Data Analysis, Probability, and Statistics	Students will design investigations and gather data involving populations* (data sets).

Grade 7 Math Learning Progressions Toward Graduation Competencies	
GRADUATION STRAND	**GRADE LEVEL COMPETENCY**
Symbolic Expression	Students will reason abstractly and manipulate symbolic expressions to represent relationships and interpret expressions and equations in terms of a given context for determining an unknown value.
Numbers and Number Systems	Students will expand their understanding of number systems, thinking flexibly and attending to precision and reasonableness when solving problems using rational numbers.
Reasoning and Computational Strategies	Students will apply additive, multiplicative, and fractional reasoning using multiple strategies (algorithms, models, manipulatives) to solve authentic applied problems Students will expand the use of computational strategies, algorithms, and proportional reasoning to rational numbers. Students will expand the use of computational strategies, algorithms, and proportional reasoning to rational and irrational

	numbers.
Metacognitive Skills and Communication	Students will use reasoning and self- monitoring to analyze and justify one or more solution pathways. Students will use reasoning and metacognitive skills* through making conjectures, justifying, and communicating mathematical solutions and arguments. Students will use reasoning and metacognitive skills through making conjectures, justifying, and effectively* communicating mathematical solutions and arguments.
Measurement	Students will use tools and apply precision and reasoning to solve measurement problems authentic applied contexts. Students will strategically use tools and apply proportional reasoning and precision to solve measurement problems in pure/theoretical and authentic applied contexts.
Algebraic Functions, Patterns, and Relations	Students will make use of structure to describe and compare situations that involve proportionality, change, or patterns and use the information to make conjectures and justify conclusions/solutions.
Geometry	Students will solve problems involving reasoning using properties of 2- and 3- dimensional shapes to analyze, represent, and model geometric relationships in pure/theoretical and authentic applied contexts. Students will solve problems involving reasoning using properties of 2- and 3- dimensional shapes to analyze, represent, and model geometric relationships in pure/theoretical and authentic applied contexts.
Data Analysis, Probability, and Statistics	Students will design investigations and conduct probability experiments involving populations.

Grade 8 Math Learning Progressions Toward Graduation Competencies	
GRADUATION STRAND	**GRADE LEVEL COMPETENCY**
Symbolic Expression	Students will reason abstractly and manipulate symbolic expressions to represent relationships and interpret expressions and equations in terms of a given context for determining an unknown value.
Numbers and Number Systems	Students will expand their understanding of number systems thinking flexibly and attending to precision and reasonableness when solving problems using rational and irrational numbers.
Reasoning and Computational Strategies	Students will expand the use of computational strategies, algorithms, and proportional reasoning to rational and irrational numbers.
Metacognitive Skills and Communication	Students will use reasoning and self- monitoring to analyze and justify one or more solution pathways. Students will use reasoning and metacognitive skills* through making conjectures, justifying, and communicating mathematical solutions and arguments. Students will use reasoning and metacognitive skills through making conjectures, justifying, and effectively* communicating mathematical solutions and arguments.
Measurement	Students will strategically use tools and apply proportional reasoning and precision to solve measurement problems in pure/theoretical and authentic applied contexts.
Algebraic Functions, Patterns, and Relations	Students will make use of structure to describe and compare situations that involve proportionality, change, or patterns and use the information to make conjectures and justify conclusions/solutions.
Data Analysis, Probability, and	Students will design investigations and conduct probability

Statistics	experiments involving populations.

Algebra I Learning Progressions Toward Graduation Competencies	
GRADUATION STRAND	**COURSE COMPETENCY**
Symbolic Expression	Students will demonstrate the ability to reason quantitatively when analyzing, representing, and solving problem. Students will demonstrate the ability to analyze and use structure in expressions to solve problems.
Numbers and Number Systems	Students will demonstrate the ability to solve problems when applying concepts of polynomials and rational expressions.
Reasoning and Computational Strategies	Students will demonstrate the ability to create and use algebraic models to connect mathematical concepts and properties when solving real-world problems. Students will demonstrate the ability to explain and justify reasoning when solving equations, inequalities,and systems of equations. Students will demonstrate the ability to interpret, analyze, and use functions when applied in a variety of contexts, including real-world phenomena. Students will demonstrate the ability to distinguish among situations that can be represented with linear and quadratic models and provide evidence to support reasoning. Students will demonstrate the ability to make inferences and justify or critique conclusions.

Metacognitive Skills and Communication	Students will demonstrate the ability to distinguish among situations that can be represented with linear and quadratic models and provide evidence to support reasoning. Students will demonstrate the ability to make inferences and justify or critique conclusions.
Measurement	
Algebraic Functions, Patterns, and Relations	Students will demonstrate the ability to interpret, analyze, and use functions when applied in a variety of contexts, including real-world phenomena. Students will demonstrate the ability to build functions that model relationships between two quantities. Students will demonstrate the ability to apply algebraic models to express geometric relationships.
Geometry	Students will demonstrate the ability to apply algebraic models to express geometric relationships
Data Analysis, Probability, and Statistics	Students will demonstrate the ability to apply statistical methods of reasoning to summarize, represent, and interpret categorical and quantitative data. Students will demonstrate the ability to apply the rules of probability including conditional probability to determine the likelihood of a given outcome.

Algebra II Learning Progressions Toward Graduation Competencies	
GRADUATION STRAND	**COURSE COMPETENCY**
Symbolic Expression	Students will demonstrate the ability to analyze and use structure in expressions to solve problems.
Numbers and Number Systems	Students will demonstrate the ability to use and extend properties of complex number systems. Students will demonstrate the ability to solve problems when applying concepts of polynomial and rational expressions.
Reasoning and Computational Strategies	Students will demonstrate the ability to create and use algebraic models to connect mathematical concepts and properties when solving real-world problems. Students will demonstrate the ability to explain and justify reasoning when solving equations, inequalities,and systems of equations. Students will demonstrate the ability to interpret, analyze, and use functions when applied in a variety of contexts, including real-world phenomena. Students will demonstrate the ability to distinguish among situations that can be represented with linear and quadratic models and provide evidence to support reasoning. Students will demonstrate the ability to make inferences and justify or critique conclusions.
Metacognitive Skills and Communication	Students will demonstrate the ability to distinguish among situations that can be represented with linear and quadratic models and provide evidence to support

	reasoning. Students will demonstrate the ability to make inferences and justify or critique conclusions.
Algebraic Functions, Patterns, and Relations	Students will demonstrate the ability to interpret, analyze, and use functions when applied in a variety of contexts, including real-world phenomena. Students will demonstrate the ability to build functions that model relationships between two quantities. Students will demonstrate the ability to apply algebraic models to express geometric relationships.
Geometry	Students will demonstrate the ability to apply algebraic models to express geometric relationships.
Data Analysis, Probability, and Statistics	Students will demonstrate the ability to apply statistical methods of reasoning to summarize, represent, and interpret categorical and quantitative data.

Pre-Calculus Learning Progressions Toward Graduation Competencies	
GRADUATION STRAND	**COURSE COMPETENCY**
Symbolic Expression	Students will demonstrate the ability to use and extend properties of complex number systems (includes both real and imaginary numbers). Students will demonstrate the ability to analyze represent vector and matrix quantities in solving problems.
Numbers and Number Systems	Students will demonstrate the ability to use and extend properties of complex number systems (includes both real and imaginary numbers).

	Students will demonstrate the ability to analyze and use structure in expressions to solve problems.
Reasoning and Computational Strategies	Students will demonstrate the ability to use and extend properties of complex number systems (includes both real and imaginary numbers). Students will demonstrate the ability to analyze represent vector and matrix quantities in solving problems. Students will demonstrate the ability to analyze and use structure in expressions to solve problems. Students will demonstrate the ability to interpret, analyze and use functions when applied in a variety of contexts including real-world phenomena. Students will demonstrate the ability to build functions that model relationships between two quantities. Students will demonstrate the ability to distinguish among situations that can be represented with linear, quadratic and exponential models and provide evidence to support reasoning. Students will demonstrate the ability to use reasoning (e.g., properties of angles and triangles) to construct and apply viable arguments about similarity. Students will demonstrate the ability to reason and apply theorems about circles. Students will demonstrate the ability to apply algebraic models to express geometric relationships. Students will demonstrate the ability to represent geometric properties with equations.
Metacognitive Skills and	Students will demonstrate the ability to create and use

Communication	algebraic models to connect mathematical concepts and properties when solving real-world problems. Students will demonstrate the ability to interpret, analyze and use functions when applied in a variety of contexts including real-world phenomena. Students will demonstrate the ability to build functions that model relationships between two quantities. Students will demonstrate the ability to distinguish among situations that can be represented with linear, quadratic and exponential models and provide evidence to support reasoning. Students will demonstrate the ability to use reasoning (e.g., properties of angles and triangles) to construct and apply viable arguments about similarity. Students will demonstrate the ability to reason and apply theorems about circles. Students will demonstrate the ability to apply algebraic models to express geometric relationships. Students will demonstrate the ability to represent geometric properties with equations.
Algebraic Functions, Patterns, and Relations	Students will demonstrate the ability to create and use algebraic models to connect mathematical concepts and properties when solving real-world problems. Students will demonstrate the ability to explain and justify reasoning when solving equations, inequalities and systems of equations. Students will demonstrate the ability to interpret, analyze and use functions when applied in a variety of contexts including real-world phenomena.

	Students will demonstrate the ability to build functions that model relationships between two quantities. Students will demonstrate the ability to distinguish among situations that can be represented with linear, quadratic and exponential models and provide evidence to support reasoning. Students will demonstrate the ability to use reasoning (e.g., properties of angles and triangles) to construct and apply viable arguments about similarity. Students will demonstrate the ability to reason and apply theorems about circles.