| Subject | Program Level Enduring Understanding | Program Level Essential Question |
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| Mathematics | MALG1: Algebra was one of the first problem-solving tools created by mankind to model real-life phenomena using numbers and variables, which represent unknown quantities. | MALG1: Why is algebra a universal problem-solving tool? Why do we need algebra in our life and our world? What is an algebraic unknown? How can we use algebra to manipulate unknowns? How can algebra help us to model real-life phenomena using numbers and variables? |
| Mathematics | MALG2: Algebra uses variables that allow us to study how two or more sets of data interrelate according to universal rules. Through these rules, we can translate real-world patterns and relations into equations, tables and graphs. | MALG2: What are variables? How does algebra use variables to study how two or more sets of data are related to one another? How can we use algebraic rules and processes to create equations to solve real-world problems? Why would we choose to create an equation vs. a graph or table? How can we translate from an equation to a graph and table? How can we use algebra to make predictions in everyday life? |
| Mathematics | MFUN1: A function is a mathematical relation that associates each object in a set with exactly one value. We use them when we want to come up with one output only for a particular input that we have. | MFUN1: What is a function? How do functions represent mathematical relations? When do we need to use functions? How can functions help us to understand the change process? |
| Mathematics | MGEO1: Geometry helps us to understand the structure of space and the spatial relations around us. | MGEO1: What is geometry? To what extent can geometry help us to understand the structure of space? How can we use geometry to analyze the spatial relations around us? |
| Mathematics | MGEO2: Through geometry we can analyze the characteristics and properties of two- and three-dimensional shapes. It also helps us to develop mathematical arguments concerning geometric relationships. | MGEO2: How can we use geometry to analyze the characteristics and properties of two- and three-dimensional shapes? How can we use geometry to develop mathematical arguments concerning geometric relationships? What determines the strength or quality of a geometric argument? |
| Mathematics | MGEO3: Geometry enables us to specify locations and describe spatial relationships using coordinate geometry | MGEO3: How can geometry enable us to specific locations? How can we use geometry to describe spatial relationships? What is coordinate geometry? How can we use it and other |

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| | and other representational systems. | representational systems to describe and analyze spatial relations? |
| Mathematics | MGEO4: Through geometry, we can apply transformations and use symmetry to analyze mathematical situations. We can use visualization, spatial reasoning, and geometric modeling to solve problems. | MGEO4: What are transformations in geometry? What is symmetry? How can we apply transformations and symmetry to analyze mathematical situations? What is visualization? What is spatial reasoning? What are geometry models? How can we use them to solve problems in everyday life? |
| Mathematics | MGEO5: Geometry enables us to measure things that can't be measured easily though traditional physical methods. | MGEO5: How can we use geometry to measure things that are not easily measured? How can we use geometric formulae and models to measure things that are difficult to measure? |
| Mathematics | MMEAS1: Measurement is a process by which we use standard and non-standard units to quantify, compare, and communicate about phenomena such as time, distance, temperature, and capacity. | MMEAS1: Why do we measure things? What are the differences between standard and non-standard units of measurements? Why would we choose to use one vs. the other? How can measurement help us to quantify, compare, and communicate about such phenomena as time, distance, temperature, and capacity? How can we translate between and among various units of measurement? To what extent can we measure things accurately? How can we apply appropriate tools, techniques, and formulas to measure things accurately? |
| Mathematics | MMREAS1: Mathematical reasoning involves making and testing mathematical conjectures, drawing logical conclusions, and justifying them. | MMREAS1: What is mathematical reasoning? How can we use reason mathematically? How can we make and test mathematical conjectures? What does it mean to draw logical conclusions? How can we justify the mathematical conclusions we draw? |
| Mathematics | MMREAS2: Logic can be both formal and informal. In mathematics, informal logic involves critical thinking and problem solving. Formal logic involves proofs, syllogisms, and other use of other external structures. | MMREAS2: What is logic? What does it mean to be logical? How can we use mathematics to make logical arguments? How do formal and informal logic differ in mathematics? How can we use such structures as proofs and syllogisms to form and support arguments? |
| Mathematics | MMREAS3: A mathematical proof is a method of constructing a valid argument using deductive and inductive | MMREAS3: What is a mathematical proof? How are inductive and deductive reasoning alike? How are they different? How can we use proofs to construct valid arguments? What are the |

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| | reasoning. | differences between validity and truth in arguments? |
| Mathematics | MNUMS2: Numbers have meaning. They represent quantities in our everyday life. | MNUMS2: What are numbers? Why do numbers have meaning? How can we determine the meaning of numbers? Why do numbers represent quantities in our everyday life? To what extent do numbers represent quantities? What would happen if we did not have numbers? |
| Mathematics | MNUMS3: We demonstrate number sense when we can order numbers and use this sequence to compare their values. | MNUMS3: How can we demonstrate number sense? Why does order of numbers matter? Why do we need to follow a numerical sequence when comparing the values of numbers? |
| Mathematics | MNUMS4: Digits have value depending upon where they are in relationship to a decimal point. | MNUMS4: What determines the value of a digit? How does the place or location of a digit in relationship to a decimal point determine its value? |
| Mathematics | MNUMS5: We demonstrate number sense when we can translate different representations of the same value. | MNUMS5: How can we translate different representations of the same value? How can we represent the same value in different ways? Why do we represent the same numbers in different ways? How can we decide the best way to represent a quantity in a particular situation? When is it appropriate to use one form of numerical representation vs. another? |
| Mathematics | MNUMS6: Estimation is not guessing. It is using our number sense to make accurate and reasonable predictions. | MNUMS6: Why is estimation not guessing? How is estimation different from guessing? How can we use number sense to make accurate and reasonable predictions? |
| Mathematics | MNUMS7: A number system is a way of organizing numbers in order to accurately and consistently represent quantities and relationships. | MNUMS7: What is a number system? How does a number system organize numbers? To what extent does a number system enable us to accurately and consistently represent quantities? |
| Mathematics | MNUMS8: A number system has a certain set of patterns that allow for predictable operations relative to the types of numbers within that system. | MNUMS8: How does a number system represent a certain set of patterns? How are these patterns related to predictable operations within the system? |

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| Mathematics | MNUMS9: In a particular system, all numbers behave in the same way, have the same attributes, and reflect rules for combining them. | MNUMS9: Why do all numbers behave in the same way within a number system? Why do all numbers have the same attributes within a number system? How can we discover and use the rules for combining numbers within a system? |
| Mathematics | MOPS1: An operation is a way of manipulating two numbers to produce a third number. | MOPS1: What is an operation in mathematics? Why is there an order in which operations need to be performed? How does the order in which operations are performed affect the result? How are different operations related to one another? |
| Mathematics | MPAT1: By describing patterns using mathematics, we can make predictions and generalizations, analyze situations in everyday life, and sort and classify things. | MPAT1: How can we use mathematics to describe patterns in everyday life? How can we represent patterns mathematically? How can mathematical patterns help us to make predictions and generalizations? How can we use mathematical patterns to analyze situations in everyday life? How can we use mathematical patterns to sort and classify things? How can we use mathematical rules to relate one set of values to a second set of values? How can we use mathematics to study and analyze the change process? |
| Mathematics | MPROB1: Probability is the study of the laws of chance. Through it we can make reasonable predictions of future outcomes based upon past trends and data patterns. | MPROB1: What is probability? How does probability represent the study of the laws of chance? How can we determine the probability of things occurring or not occurring? To what extent can chance be said to have laws? How can we use past trends and data patterns to make predictions about the future? What makes something probable or improbable? |
| Mathematics | MPRSO1: Effective problem solving begins by unpacking the question that needs to be answered. Then, you need to determine the best strategy to answer the question. | MPRSO1: What is effective problem solving? Why does effective problem solving begin with unpacking a question that needs to be answered? How can you determine effective strategies for solving a problem? How can you evaluate your solution to a problem to determine its accuracy and reasonableness? How can you explain your solutions to others? |
| Mathematics | MSTAT1: Statistics is the process of collecting, organizing, analyzing, and | MSTAT1: What is statistics? How can we use statistics to collect, organize, analyze, and interpret data? To what extent can statistics help |

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| | interpreting data to make and evaluate inferences and predictions about our world. | us to make inferences and predictions about our world? How can we determine if statistics are valid and reliable? To what extent do statistics require interpretation rather than offering straightforward conclusions? How can we determine the soundness of the reasoning extending from statistical analysis? |
| Mathematics | MTEC1: Technology can enhance but not replace our mathematical skills and increase our effectiveness in dealing with computation and data analysis. | MTEC1: To what extent can technology enhance our mathematical skills? Why can technology support but not replace our mathematics skills and understandings? When should I use technology? How can I use technology to compute and analyze data? What can I do with technology that I could not do otherwise? |
| Mathematics | MTEC2: Some mathematics becomes more important because technology requires it, some becomes less important because technology replaces it, and some becomes possible because technology allows it. | MTEC2: How can technology make some mathematics more important? To what extent can technology replace certain aspects of mathematics? How can technology make possible breakthroughs and innovations in mathematics? |
| Mathematics | Technology 1. Individuals have rights and responsibilities that accompany the use of technology to share information. | Technology 1: What are our rights and responsibilities when using information technology? How can we use others' ideas ethically? What are the risks and benefits of sharing information? |
| Mathematics | Technology 2: Technology facilitates communication by expanding the opportunity for collaborative experiences and breaking down the barriers of time, space, and perspective. | Technology 2: How does technology facilitate communication? How can technology expand the opportunity for collaborative experiences? To what extent does technology breakdown the barriers of time, space, and perspective? |
| Mathematics | Technology 3: Information can be biased or inaccurate. Multiple sources should be used to evaluate information. | Technology 3: How does one evaluate information for bias or inaccuracies? • How does one go about evaluating information for credibility, reliability, authority, and authenticity? |
| Mathematics | Technology 4: Research is a cyclical process of formulating and answering a question to solve a problem. Researchers | Technology 4: What makes a good question? • How do we know what to believe (from what we hear, read, and see)? • How do we use research to effectively solve problems? |

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| | gather, evaluate, organize, analyze, synthesize, and then communicate or act on information in a meaningful way. | |
| Mathematics | Technology 5: Problem-solving is a systematic process employed to answer a question, to address an issue, or to fulfill a need. | Technology 5: How do we use technology to effectively solve problems? |
| Mathematics | Technology 6: Technology provides access to tools and information resources that facilitate the problem-solving and inquiry processes. | Technology 6: How do you select appropriate tools and resources for a given task? |
| Mathematics | Technology 7: Technology is both a physical and an abstract tool. Its power lies within the interaction between the user and the tool. Technology is a medium for self-expression, and it may open unexpected avenues for exploration and insight. | Technology 7: In what ways can technology enhance creativity? • How do technology and creativity interact? |
| Mathematics | Technology 8: The development, use, and implementation of technology produce desired results, unanticipated opportunities, and unintended consequences. | Technology 8: To what extent does technology affect the quality of life? • To what extent does technology produce desired results, unanticipated opportunities, and unintended consequences? • To what extent has the evolution of technology outpaced man's ability to control it? |