

Mathematics Guiding Document

Long-term Transfer Goal(s):

Long-term aims of the PK-12 program: An overall end result of a student's education in Madison.

Students will be able to independently use their learning to:

1. initiate a plan using a variety of methods/strategies appropriately, execute it, and evaluate the reasonableness and accuracy of the solution.
2. represent situations using mathematical reasoning and symbols.
3. construct viable arguments using clear and appropriate mathematical language and critique the reasoning of others.
4. apply models to solve problems.
5. choose appropriate tools to make reaching solutions more efficient, accessible and accurate.
6. demonstrate fluency with mathematical computations and definitions.
7. identify and generalize patterns and structure in numbers, expressions, data and objects.
8. apply an understanding of known patterns to new problems and make connections between concepts.

Stage One: Guiding Document for Mathematics

Standards:	Understandings:	Essential Questions:
CCSS.Math.Practice.MP1 Make sense of problems and persevere in solving them • change view- monitor progress and change course if necessary • look for an entry point • simplify forms • examine trends • What does my solution mean? • What similar problems does this remind me of? • understand someone else's approach	Mathematicians work to make sense of the problem before trying to solve it. Mathematicians monitor progress while problem solving, change course if necessary and evaluate the reasonableness of their solution.	What makes an effective problem solver? What do effective problem solvers do when they get stuck? How do I determine that my answer makes sense? What does my solution mean?
CCSS.Math.Practice.MP2 Reason abstractly and quantitatively • sense of quantities • abstract to symbolic • conceptualize • representation of problem and meaning of qualities • deconstruct	Mathematicians make sense of quantities to represent situations mathematically. Mathematicians attend to the underlying meaning of quantities and symbols.	How can the relationship between quantities be represented? What do the quantities mean? Does my abstract representation of these quantities make sense in context?
CCSS.Math.Practice.MP6 Attend to precision. • use symbols carefully • calculate accurately and efficiently • carefully formulated explanations--claims • the specify units • clear definitions and use of language	Mathematicians calculate efficiently and accurately while using appropriate symbols and labels. Mathematicians communicate precisely and clearly using mathematical definitions.	How do I check my work for accuracy and completeness? What can I do to make my solution sufficiently clear? How can I use mathematical definitions to better explain my solution?

Standards:	Understandings:	Essential Questions:
CCSS.Math.Practice.MP3 Construct viable arguments and critique the reasoning of others. • assumptions, results, definitions to arguments • conjecture • counter examples • justify and respond to others • origin of data • compare and see flaws in arguments • determine doins • clarify • can listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.	Mathematicians construct viable arguments to explain problems, solutions, and mathematical representations. Mathematicians can listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.	What did I hear and how has that changed my thinking? Have I sufficiently supported my answer and shown my work? How can I strengthen my argument and reasoning?
CCSS.Math.Practice.MP4 Model with mathematics. • apply to situations • solve problems and explain • assumptions and approximations • revise • tools and charts • interpret results	Mathematicians create or use models to generalize, represent, and solve problems.	What model best represents this problem? How can the model created be tested and improved?
CCSS.Math.Practice.MP5 Use appropriate tools strategically. • consider tools • sound decisions about insight and limitations • detect errors- estimations • technology • id resources • deepen understanding	Mathematicians strategically use different tools to build conceptual knowledge or solve problems. Mathematicians evaluate the usefulness and limitations of the tool for the given situation.	What tool is most effective and efficient? What are the strengths and weaknesses of the tools at hand?

Standards:	Understandings:	Essential Questions:
CCSS.Math.Practice.MP7 Look for and make use of structure. • a pattern or structure • significance • step back for a shift in perspective • decompose • problem strings	Mathematicians see patterns to make generalizations about structures and relationships.	What patterns are present? What generalizations can be made from this pattern? What is the significance of this pattern?
CCSS.Math.Practice.MP8 Look for and express regularity in repeated reasoning. • repeated calculations • general methods and shortcuts • repeating calculations • regularity • oversight of process while attention to details	Mathematicians use their knowledge from patterns and structures to apply efficient strategies to solve a problem.	How can a pattern be generalized to a rule? How can we apply knowledge of a pattern to similar problems? What is a way of expressing the recurring pattern?