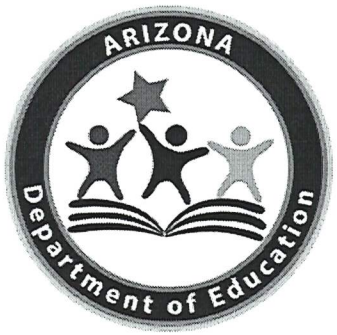
Documents for Agenda Item 9:
Arizona Math Standards



Arizona Mathematics Standards

Plus Standards for High School

ARIZONA DEPARTMENT OF EDUCATION
HIGH ACADEMIC STANDARDS FOR STUDENTS
December, 2016

Geometry Overview

NUMBER AND QUANTITY - N

The Complex Number System (N-CN)

- Perform arithmetic operations with complex numbers.
- Represent complex numbers and their operations on the complex plane.
- Use complex numbers in polynomial identities and equations.

Vector and Matrix Quantities (N-VM)

- Represent and model with vector quantities.
- Perform operations on vectors.
- Perform operations on matrices and use matrices in applications.

Algebra - A

Arithmetic with Polynomials and Rational Expressions (A-APR)

- Use polynomial identities to solve problems.
- Rewrite rational expressions.

Reasoning with Equations and Inequalities (A-REI)

- Solve systems of equations.

Functions - F

Interpreting Functions (F-IF)

- Analyze functions using different representations.

Building Functions (F-BF)

- Build a function that models a relationship between two quantities.
- Build new functions from existing functions.

Trigonometric Functions (F-TF)

- Extend the domain of trigonometric functions using the unit circle.
- Model periodic phenomena with trigonometric functions.
- Apply trigonometric identities.

Geometry – G

Similarity, Right Triangles, and Trigonometry (G-SRT)

- Apply trigonometry to general triangles.

Circles (G-C)

- Understand and apply theorems about circles.

Expressing Geometric Properties with Equations (G-GPE)

- Translate between the geometric description and the equation for a conic section.

Geometric Measurement and Dimension (G-GMD)

- Explain volume formulas and use them to solve problems.

Statistics and Probability - S

Making Inferences and Justifying Conclusions (S-IC)

- Make inferences and justify conclusions from sample surveys, experiments, and observational studies.

Conditional Probability and the Rules of Probability (S-CP)

- Use the rules of probability to compute probabilities of compound events in a uniform probability model.

Using Probability to Make Decisions (S-MD)

- Calculate expected values and use them to solve problems.
- Use probability to evaluate outcomes of decisions.

Contemporary Mathematics - CM

Discrete Mathematics (CM-DM)

- Understand and apply vertex-edge graph topics.

Standards for Mathematical Practices (MP)

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

Arizona Mathematics Standards Plus Standards

Number and Quantity - N			
The Complex Number System (N–CN)			
P.N-CN.A **Perform arithmetic operations with complex numbers.**		**P.N-CN.A.3**	Find the conjugate of a complex number; use conjugates to find moduli and quotients of complex numbers.
P.N-CN.B **Represent complex numbers and their operations on the complex plane.**		**P.N-CN.B.4**	Represent complex numbers on the complex plane in rectangular and polar form, including real and imaginary numbers, and explain why the rectangular and polar forms of a given complex number represent the same number.
		P.N-CN.B.5	Represent addition, subtraction, multiplication, and conjugation of complex numbers geometrically on the complex plane; use properties of this representation for computation. *For example,* $(-1 + \sqrt{3}\, i)^3 = 8$ *because* $(-1 + \sqrt{3}\, i)$ *has modulus 2 and argument 120°.*
		P.N-CN.B.6	Calculate the distance between numbers in the complex plane as the modulus of the difference, and the midpoint of a segment as the average of the numbers at its endpoints.
P.N-CN.C **Use complex numbers in polynomial identities and equations.**		**P.N-CN.C.8**	Extend polynomial identities to the complex numbers.
		P.N-CN.C.9	Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials.
Vector and Matrix Quantities (N–VM)			
P.N-VM.A **Represent and model with vector quantities.**	PC	**P.N-VM.A.1**	Recognize vector quantities as having both magnitude and direction. Represent vector quantities by directed line segments, and use appropriate symbols for vectors and their magnitudes.
	PC	**P.N-VM.A.2**	Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point.
		P.N-VM.A.3	Solve problems involving velocity and other quantities that can be represented by vectors.
P.N-VN.B **Perform operations on vectors.**	PC	**P.N-VM.B.4**	Add and subtract vectors. a. Add vectors end-to-end, component-wise, and by the parallelogram rule. Understand that the magnitude of a sum of two vectors is typically not the sum of the magnitudes. b. Given two vectors in magnitude and direction form, determine the magnitude and direction of their sum. c. Understand vector subtraction **v** – **w** as **v** + (–**w**), where –**w** is the additive inverse of **w**, with the

			same magnitude as **w** and pointing in the opposite direction. Represent vector subtraction graphically by connecting the tips in the appropriate order, and perform vector subtraction component-wise.
P.N.-VN.B (cont.)	PC	**P.N-VM.B.5**	Multiply a vector by a scalar. a. Represent scalar multiplication graphically by scaling vectors and possibly reversing their direction; perform scalar multiplication component-wise e.g., as $c(v_x, v_y) = (cv_x, cv_y)$. b. Compute the magnitude of a scalar multiple **cv** using $\|\|c\mathbf{v}\|\| = \|c\|v$. Compute the direction of **cv** knowing that when $\|c\|v \neq 0$, the direction of $c\mathbf{v}$ is either along **v** (for $c > 0$) or against **v** (for $c < 0$).
P.N-VM.C **Perform operations on matrices and use matrices in applications**	PC	**P.N-VM.C.6**	Use matrices to represent and manipulate data.
		P.N-VM.C.7	Multiply matrices by scalars to produce new matrices.
		P.N-VM.C.8	Add, subtract, and multiply matrices of appropriate dimensions.
		P.N-VM.C.9	Understand that, unlike multiplication of numbers, matrix multiplication for square matrices is not a commutative operation, but still satisfies the associative and distributive properties.
		P.N-VM.C.10	Understand that the zero and identity matrices play a role in matrix addition and multiplication similar to the role of 0 and 1 in the real numbers. The determinant of a square matrix is nonzero if and only if the matrix has a multiplicative inverse.
		P.N-VM.C.11	Multiply a vector (regarded as a matrix with one column) by a matrix of suitable dimensions to produce another vector. Work with matrices as transformations of vectors.
		P.N-VM.C.12	Work with 2 x 2 matrices as transformations of the plane, and interpret the absolute value of the determinant in terms of area
Algebra - A			
Arithmetic with Polynomials and Rational Expressions (A–APR)			
P.A-APR.C **Use polynomial identities to solve problems.**		**P.A-APR.C.5**	Know and apply the Binomial Theorem for the expansion of $(x + y)^n$ in powers of x and y for a positive integer n, where x and y are any numbers, with coefficients determined for example by Pascal's Triangle. The Binomial Theorem can be proved by mathematical induction or by a combinatorial argument.
P.A-APR.D **Rewrite rational expressions.**		**P.A-APR.D.7**	Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.

Arizona Mathematics Standards Plus Standards

Reasoning with Equations and Inequalities (A-REI)			
P.A-REI.C **Solve systems of equations.**		**P.A-REI.C.8**	Represent a system of linear equations as a single matrix equation in a vector variable.
		P.A-REI.C.9	Find the inverse of a matrix if it exists, and use it to solve systems of linear equations (using technology for matrices of dimension 3 x 3 or greater).
Functions - F			
Interpreting Functions (F–IF)			
P.F-IF.C **Analyze functions using different representations.**	PC	**P.F-IF.C.7**	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.
Building Functions (F-BF)			
P.F-BF.A **Build a function that models a relationship between two quantities.**	PC	**P.F-BF.A.1**	Write a function that describes a relationship between two quantities. c. Compose functions. *For example, if T(y) is the temperature in the atmosphere as a function of height, and h(t) is the height of a weather balloon as a function of time, then T(h(t)) is the temperature at the location of the weather balloon as a function of time.*
P.F-BF.B **Build new functions from existing functions.**	PC	**P.F-BF.B.4**	Find inverse functions. b. Verify by composition that one function is the inverse of another. c. Read values of an inverse function from a graph or a table, given that the function has an inverse. d. Produce an invertible function from a non-invertible function by restricting the domain.
		P.F-BF.B.5	Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.

Arizona Mathematics Standards Plus Standards

Trigonometric Functions (F–TF)			
P.F-TF.A **Extend the domain of trigonometric functions using the unit circle.**	PC	**P.F-TF.A.3**	Use special triangles to determine geometrically the values of sine, cosine, tangent for $\pi/3$, $\pi/4$ and $\pi/6$, and use the unit circle to express the values of sine, cosine, and tangent for $\pi-x$, $\pi+x$, and $2\pi-x$ in terms of their values for x, where x is any real number.
		P.F-TF.A.4	Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions.
P.F-TF.B **Model periodic phenomena with trigonometric functions.**	PC	**P.F-TF.B.6**	Understand that restricting a trigonometric function to a domain on which it is always increasing or always decreasing allows its inverse to be constructed.
		P.F-TF.B.7	Use inverse functions to solve trigonometric equations utilizing real world context; evaluate the solution and interpret them in terms of context.
P.F-TF.C **Apply trigonometric identities.**	PC	**P.F-TF.C.9**	Prove the addition and subtraction formulas for sine, cosine, and tangent and use them to solve problems.
Geometry - G			
Similarity, Right Triangles, and Trigonometry (G-SRT)			
P.G-SRT.D **Apply trigonometry to general triangles.**	PC	**P.G-SRT.D.9**	Derive the formula $A = \frac{1}{2}\,ab\sin(C)$ for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.
		P.G-SRT.D.10	Prove the Laws of Sines and Cosines and use them to solve problems.
		P.G-SRT.D.11	Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces).
Circles (G-C)			
P.G-C.A **Understand and apply theorems about circles.**		**P.G-C.A.4**	Construct a tangent line from a point outside a given circle to the circle.
Expressing Geometric Properties with Equations (G-GPE)			
P.G-GPE.A **Translate between the geometric description and the equation for a conic section.**	PC	**P.G-GPE.A.2**	Derive the equation of a parabola given a focus and directrix.
		P.G-GPE.A.3	Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or difference of distances from the foci is constant.

Arizona Mathematics Standards Plus Standards

Geometric Measurement and Dimension (G-GMD)			
P.G-GMD.A **Explain volume formulas and use them to solve problems.**		**P.G-GMD.A.2**	Give an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures.
Statistics and Probability - S			
Making Inferences and Justifying Conclusions (S-IC)			
P.S-IC.B **Make inferences and justify conclusions from sample surveys, experiments, and observational studies.**	QR	**P.S-IC.B.3**	Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.
		P.S-IC.B.4	Use data from a random sample to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.
		P.S-IC.B.5	Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.
	QR	**P.S-IC.B.6**	Evaluate reports based on data.
Conditional Probability and the Rules of Probability (S-CP)			
P.S-CP.B **Use the rules of probability to compute probabilities of compound events in a uniform probability model.**	QR	P.S-CP.B.9	Use permutations and combinations to compute probabilities of compound events and solve problems.
Using Probability to Make Decisions (S-MD)			
P.S-MD.A **Calculate expected values and use them to solve problems.**		P.S.MD.A.1	Define a random variable for a quantity of interest by assigning a numerical value to each event in a sample space; graph the corresponding probability distribution using the same graphical displays as for data distributions.
	QR	P.S.MD.A.2	Calculate the expected value of a random variable; interpret it as the mean of the probability distribution.
	QR	P.S.MD.A.3	Develop a probability distribution for a random variable defined for a sample space in which theoretical probabilities can be calculated. Find the expected value. *For example, find the theoretical probability distribution for the number of correct answers obtained by guessing on all five questions of a multiple-choice test where each question has four choices, and find the expected grade under various grading schemes.*

	QR	P.S.MD.A.4	Develop a probability distribution for a random variable defined for a sample space in which probabilities are assigned empirically. Find the expected value. *For example, find a current data distribution on the number of TV sets per household in the United States, and calculate the expected number of sets per household. How many TV sets would you expect to find in 100 randomly selected households?*
P.S-MD.B **Use probability to evaluate outcomes of decisions.**	QR	P.S.MD.B.5	Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values. a. Find the expected payoff for a game of chance. *For example, find the expected winnings from a state lottery ticket or a game at a fast-food restaurant.* b. Evaluate and compare strategies on the basis of expected values. *For example, compare a high-deductible versus a low-deductible automobile insurance policy using various, but reasonable, chances of having a minor or a major accident.*
		P.S.MD.B.6	Use randomization to make fair decisions based on probabilities.
	QR	P.S.MD.B.7	Analyze decisions and strategies using probability concepts.
Contemporary Mathematics - CM			
Discrete Mathematics - (CM-DM)			
P.CM-DM.A **Understand and apply vertex-edge graph topics**	QR	P.CM-DM.A.1	Study the following topics related to vertex-edge graph: Euler circuits, Hamilton circuits, shortest path, vertex coloring, and adjacency matrices.
	QR	P.CM-DM.A.2	Understand, analyze, and apply vertex-edge graphs to model and solve problems related to paths, circuits, networks, and relationships among a finite number of elements, in real-world and abstract settings.
	QR	P.CM-DM.A.3	Devise, analyze, and apply algorithms for solving vertex-edge graph problems.
	QR	P.CM-DM.A.4	Extend work with adjacency matrices for graphs, such as interpreting row sums and using the *n*th power of the adjacency matrix to count paths of length *n* in a graph.

Arizona Mathematics Standards Plus Standards

Standards for Mathematical Practice	
P.MP.1	**Make sense of problems and persevere in solving them.** Mathematically proficient students explain to themselves the meaning of a problem, look for entry points to begin work on the problem, and plan and choose a solution pathway. While engaging in productive struggle to solve a problem, they continually ask themselves, "Does this make sense?" to monitor and evaluate their progress and change course if necessary. Once they have a solution, they look back at the problem to determine if the solution is reasonable and accurate. Mathematically proficient students check their solutions to problems using different methods, approaches, or representations. They also compare and understand different representations of problems and different solution pathways, both their own and those of others.
P.MP.2	**Reason abstractly and quantitatively.** Mathematically proficient students make sense of quantities and their relationships in problem situations. Students can contextualize and decontextualize problems involving quantitative relationships. They contextualize quantities, operations, and expressions by describing a corresponding situation. They decontextualize a situation by representing it symbolically. As they manipulate the symbols, they can pause as needed to access the meaning of the numbers, the units, and the operations that the symbols represent. Mathematically proficient students know and flexibly use different properties of operations, numbers, and geometric objects and when appropriate they interpret their solution in terms of the context.
P.MP.3	**Construct viable arguments and critique the reasoning of others.** Mathematically proficient students construct mathematical arguments (explain the reasoning underlying a strategy, solution, or conjecture) using concrete, pictorial, or symbolic referents. Arguments may also rely on definitions, assumptions, previously established results, properties, or structures. Mathematically proficient students make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. Mathematically proficient students present their arguments in the form of representations, actions on those representations, and explanations in words (oral or written). Students critique others by affirming or questioning the reasoning of others. They can listen to or read the reasoning of others, decide whether it makes sense, ask questions to clarify or improve the reasoning, and validate or build on it. Mathematically proficient students can communicate their arguments, compare them to others, and reconsider their own arguments in response to the critiques of others.
P.MP.4	**Model with mathematics.** Mathematically proficient students apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. When given a problem in a contextual situation, they identify the mathematical elements of a situation and create a mathematical model that represents those mathematical elements and the relationships among them. Mathematically proficient students use their model to analyze the relationships and draw conclusions. They interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.

Arizona Mathematics Standards Plus Standards

P.MP.5	**Use appropriate tools strategically.** Mathematically proficient students consider available tools when solving a mathematical problem. They choose tools that are relevant and useful to the problem at hand. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful; recognizing both the insight to be gained and their limitations. Students deepen their understanding of mathematical concepts when using tools to visualize, explore, compare, communicate, make and test predictions, and understand the thinking of others.
P.MP.6	**Attend to precision.** Mathematically proficient students clearly communicate to others using appropriate mathematical terminology, and craft explanations that convey their reasoning. When making mathematical arguments about a solution, strategy, or conjecture, they describe mathematical relationships and connect their words clearly to their representations. Mathematically proficient students understand meanings of symbols used in mathematics, calculate accurately and efficiently, label quantities appropriately, and record their work clearly and concisely.
P.MP.7	**Look for and make use of structure.** Mathematically proficient students use structure and patterns to assist in making connections among mathematical ideas or concepts when making sense of mathematics. Students recognize and apply general mathematical rules to complex situations. They are able to compose and decompose mathematical ideas and notations into familiar relationships. Mathematically proficient students manage their own progress, stepping back for an overview and shifting perspective when needed.
P.MP.8	**Look for and express regularity in repeated reasoning.** Mathematically proficient students look for and describe regularities as they solve multiple related problems. They formulate conjectures about what they notice and communicate observations with precision. While solving problems, students maintain oversight of the process and continually evaluate the reasonableness of their results. This informs and strengthens their understanding of the structure of mathematics which leads to fluency.

Standards for Mathematical Practice

1 Make sense of problems and persevere in solving them

2 Reason abstractly and quantitatively

3 Construct viable arguments and critique the reasoning of others

4 Model with mathematics

5 Use appropriate tools strategically

6 Attend to precision

7 Look for and make use of structure

8 Look for and express regularity in repeated reasoning

Which SMP(s) did you experience throughout this task?

ADE Math Team:

Eboney.McKinney@azed.gov - Director of Math and Ed Tech Standards

Laurel.Cherry@azed.gov - K-12 Math Specialist

Marisa.Tualla@azed.gov - K-12 Math Specialist

Math Teaching Practices

From NCTM's Principles to Actions

1 Establish Math Goals to Focus Learning

2 Implement Tasks that Promote Reasoning and Problem Solving

3 Use and Connect Mathematical Representations

4 Facilitate Meaningful Discourse

5 Pose Purposeful Questions

6 Build Procedural Fluency from Conceptual Understanding

7 Support Productive Struggle

8 Elicit and Use Evidence of Student Thinking

ADE Math Team:
Eboney.McKinney@azed.gov - Director of Math and Ed Tech Standards
Laurel.Cherry@azed.gov - K-12 Math Specialist
Marisa.Tualla@azed.gov - K-12 Math Specialist

ARIZONA Department of Education

Modernizing the Mathematics Classroom

This document is intended to help guide teachers on the big ideas of how to create a modern mathematical classroom.

Top 10 Practices for your mathematics Classroom

1. Ensure that *ALL* students have access to grade-level standards.
2. Create daily opportunities for students to engage with the Standards of Mathematical Practice (SMPs).
3. Utilize the 8 Mathematical Teaching Practices from NCTM's Principles to Actions.
4. Create a student-centered classroom.
5. Continually foster your and your students' Mathematical Identity and Agency.
6. You and your students should use the 10 Dimensions of Formative Assessment daily.
7. Create opportunities for students to make connections across multiple representations.
8. Allow students to engage in productive struggle.
9. Facilitate productive student discourse.
10. Incorporate rigorous, grade-level, and group-worthy math tasks.

Additional Learning

- Catalyzing Change Key Recommendations
- Building Growth Mindset
- Playing and taking risks
- Classroom is a safe space to make mistakes
- Confidence Building
- Habits of Mind
- The Opportunity Myth
- ADE Math Document - SMP's and SEL
- Fluency Without Fear
- The Evolution of the SMPs in the Math Classroom
- Progression Documents
- Feedback
- Never Say Anything a Student Can Say
- Culturally Relevant Instructional Practices
- Complex Instruction
- Problem-Based
- Features of Quality Tasks
- Formative Assessment: Common Core Standards in the Math ClassroomAn Enabler of Learning

Documents for Agenda Item 10:
Establishing Criteria for Vendor Communication

Introduction to Statistics Course Curriculum Criteria

- **Alignment with Arizona State Math Standards**:
  -
- **Rigorous Mathematical Content**:
  - Includes college-level math content and skills, ensuring students are prepared for higher-level statistical application
- **Assessment Methods**:
  - Includes various assessment methods such as formative and summative assessments, practice exams, and performance tasks that prepare students for success in college-level math courses
- **Teacher Training**:
  - Provides professional development that ensures that teachers are prepared to teach the course successfully using the curriculum.
- **Equity and Access**:
  - Promotes equity and access, ensuring all students have the opportunity to succeed in this course.
- **Teacher Resources:**
  - Provides a detailed course syllabus that includes a timeline, unit plans, scope and sequence, and instructional strategies. Specifies the necessary prerequisite skills, worksheets, videos, and other resources needed to effectively teach the course.
- **Student Support**:
  - Includes strategies for supporting diverse learners.
  - Includes strategies for student engagement.
- **Technology Integration**:
  - Incorporates technology to enhance mathematical and statistical learning and provides access to digital resources and simulations.

Documents for Agenda Item 11:
Sample Rubric Review

Secondary Science Curriculum Adoption
Curriculum Evaluation Rubric

Scottsdale Unified SCHOOL DISTRICT

Committee Member ID _____

Material Number _____

Grade/Course Alignment _____

Publisher/Vendor _____

Material/Text Name _____

_____

_____

0 = None 1 = Inadequate/Developing 2 = Adequate 3 = Extensive

Adapted from the EQuIP Rubric

Category I: 3D Design ***The lesson/unit is designed so students make sense of phenomena and/or design solutions to problems by engaging in student performances that integrate the three dimensions of the AZSS.***	**Evidence of Quality**	**Comments**
1A. **Explaining Phenomena/Designing Solutions**: Making sense of phenomena and/or designing solutions to a problem drive student learning. i. Student questions and prior experiences related to the phenomenon or problem motivate sense-making and/or problem solving. ii. The focus of the lesson is to support students in making sense of phenomena and/or designing solutions to problems. iii. When engineering is a learning focus, it is integrated with developing disciplinary core ideas from physical, life, and/or earth and space sciences.	0 1 2 3	
1B. **Three Dimensions**: Builds understanding of multiple grade-appropriate elements of the SEPs, DCIs, and CCCs *that are deliberately selected to aid student sense-making of phenomena and/or designing of solutions*.		
i. Provides opportunities to *develop and use* specific elements of the Science and Engineering Practices, SEP(s). Curriculum is consistently laboratory/investigation-based.	0 1 2 3	
ii. Provides opportunities to *develop and use* specific elements of the Core Ideas, DCI(s). Core Ideas align to grade level/course Arizona Science Standards. If applicable, core ideas align to AP CollegeBoard, Dual Enrollment, and/or International Baccalaureate competencies.	0 1 2 3	
iii. Provides opportunities to *develop and use* specific elements of the CCC(s).	0 1 2 3	
1C. **Integrating the Three Dimensions:** Student sense-making of phenomena and/or designing of solutions requires student performances that integrate elements of the SEPs, CCCs, and DCIs	0 1 2 3	
1D. **Scientific Accuracy:** Uses scientifically accurate and grade-appropriate scientific information, phenomena, and representations to support students' three-dimensional learning.	0 1 2 3	
1E. **Multiple Science Domains**: *When appropriate*, links are made across the science domains of life science, physical science and Earth and space science. i. Disciplinary core ideas from different disciplines are used together to explain phenomena.	0 1 2 3	
1F. **Interdisciplinary:** Provides grade-appropriate connections to other contents (Mathematics, English Language Arts, History/Social Sciences, Technical Subjects, etc.).	0 1 2 3	
Rating for Category I: 3D Design 14-24 points: Move on to Categories II and III as long as there are no 0s or 1s in criteria A-D 0-13 points: The review should stop.		**__/24**

0 = None 1 = Inadequate/Developing 2 = Adequate 3 = Extensive

Adapted from the EQuIP Rubric

Category II: Instructional Supports ***The lesson/unit supports three-dimensional teaching and learning for ALL students by placing the lesson in a sequence of learning for all three dimensions and providing support for teachers to engage all students.***	**Evidence of Quality**	**Comments**
2A. **Relevance and Authenticity:** Engages students in authentic and meaningful scenarios that reflect the practice of science and engineering as experienced in the real world. i. Students experience phenomena or design problems as directly as possible (firsthand or through media representations). ii. Includes suggestions for how to connect instruction to the students' home, neighborhood, community and/or culture as appropriate. iii. Provides opportunities for students to connect their explanation of a phenomenon and/or their design solution to a problem to questions from their own experience. iv. Resources spark student interest.	0 1 2 3	
2B. **Student Ideas:** Provides opportunities for students to express, clarify, justify, interpret, and represent their ideas and respond to peer and teacher feedback orally and/or in written form as appropriate.	0 1 2 3	
2C. **Building Progressions:** Identifies and builds on students' prior learning in all three dimensions, including providing the following support to teachers: i. Explicitly identifying prior student learning expected for all three dimensions ii. Clearly explaining how the prior learning will be built upon.	0 1 2 3	
2D. **Unit Coherence:** Lessons fit together to target a set of performance expectations. i. Each lesson builds on prior lessons by addressing questions raised in those lessons, cultivating new questions that build on what students figured out, or cultivating new questions from related phenomena, problems, and prior student experiences. ii. The lessons help students develop toward proficiency in a targeted set of performance expectations.	0 1 2 3	
2E. **Differentiated Instruction:** Provides guidance for teachers to support differentiated instruction by including: i. Supportive ways to access instruction, including appropriate linguistic, visual, and kinesthetic engagement opportunities that are essential for effective science and engineering learning and particularly beneficial for multilingual learners and students with disabilities. ii. Extra support (e.g., phenomena, representations, tasks) for students who are struggling to meet the targeted expectations. iii. Extensions for students with high interest or who have already met the performance expectations to develop deeper understanding of the practices, disciplinary core ideas, and crosscutting concepts.	0 1 2 3	
2F. **Teacher Support for Unit Coherence:** Supports teachers in facilitating coherent student learning experiences over time by: i. Providing strategies for linking student engagement across lessons (e.g. cultivating new student questions at the end of a lesson in a way that leads to future lessons, helping students connect related problems and phenomena across lessons, etc.). ii. Providing strategies for ensuring student sense-making and/or problem-solving is linked to learning in all three dimensions. iii. Resources are available in multiple formats for both students and teachers.	0 1 2 3	
2G. **Scaffolded differentiation over time:** Provides supports to help students engage in the practices as needed and gradually adjusts supports over time so that students are increasingly responsible for making sense of phenomena and/or designing solutions to problems. Supports collaboration, communication, creativity and critical thinking.	0 1 2 3	
Rating for Category II: Instructional Supports		**___/21**

0 = None 1 = Inadequate/Developing 2 = Adequate 3 = Extensive

Adapted from the EQuIP Rubric

Category III: Monitoring Student Progress ***The lesson/unit supports monitoring student progress in all three dimensions of the NGSS as students make sense of phenomena and/or design solutions to problems.***	**Evidence of Quality**	**Comments**
3A. **Monitoring 3D student performances:** Elicits direct, observable evidence of three-dimensional learning; students are using practices with core ideas and crosscutting concepts to make sense of phenomena and/or to design solutions.	0 1 2 3	
3B. **Formative:** Embeds formative assessment processes throughout that evaluate student learning to inform instruction.	0 1 2 3	
3C. **Scoring guidance:** Includes aligned rubrics and scoring guidelines that provide guidance for interpreting student performance along the three dimensions to support teachers in (a) planning instruction and (b) providing ongoing feedback to students.	0 1 2 3	
3D. **Unbiased tasks/items:** Assesses student proficiency using methods, vocabulary, representations, and examples that are accessible and unbiased for all students.	0 1 2 3	
3E. **Coherent Assessment system:** Includes pre-, formative, summative, and self-assessment measures that assess three-dimensional learning.	0 1 2 3	
3F. **Opportunity to learn**: Provides multiple opportunities for students to demonstrate performance of practices connected with their understanding of disciplinary core ideas and crosscutting concepts and receive feedback	0 1 2 3	
Rating for Section III: Monitoring Student Progress		**__/18**

Category Ratings			**TOTAL SCORE**
Category I: 3D Design	**Category II: Instructional Supports**	**Category III: Monitoring Student Progress**	
__/24	**__/21**	**__/18**	**__/63**

Notes

0 = None 1 = Inadequate/Developing 2 = Adequate 3 = Extensive

Adapted from the EQuIP Rubric

MNS Textbook Adoption Evaluation Rubric

Course/Grade:	
Textbook name:	
Publisher:	
Copyright:	
Teacher completing this form:	

Part I		
Standards Alignment		
Does this textbook align with Wisconsin Academic Standards or Common Core State Standards?	Yes	No

Part II			
Work Students Do	**Does not meet**	**Meets**	**Exceeds**
Engaging Prior Knowledge: Review to determine the extent to which the instructional materials include strategies that help students to: •Think about their current understanding and functional knowledge as it relates to a core concept •Build on previously learned skills across	**1**	**2**	**3**
Metacognition Instructional materials include strategies that help students to: •Recognize the goals of the chapter/unit as well as **their** own learning goals •Assess their own learning •Reflect, over time, on what and how they have learned	**1**	**2**	**3**
Concept Development **The development of the concepts, or functional knowledge, for each topic area is essential so that students will achieve the performance outcomes for the selected topic areas.** **Review textbook material to generally determine if:**			
Sufficient information is provided for students to be able to demonstrate competency in each concept (Providing sufficient information contributes directly to a student's achievement of the performance outcomes for a standard/concept)	**1**	**2**	**3**
Illustrations, graphs, charts, and demonstrations are current, correlated, and accurate and presented in a variety of formats	**1**	**2**	**3**
The textbook provides objectives as well as review and reinforcement of concepts and vocabulary	**1**	**2**	**3**
Glossaries, bibliographies, indices, appendices, and tables of content are included, comprehensive, and easy to use	**1**	**2**	**3**
Essential questions are included in the chapter or lesson to guide students in recognizing "big ideas"	**1**	**2**	**3**
Learning objectives are included in chapters or lessons to guide students in recognizing what they should be able to demonstrate	**1**	**2**	**3**
The textbook materials provide guidance to the student regarding practicing, applying and rehearsing the skill using real life scenarios	**1**	**2**	**3**
The textbook materials provide rigorous exercises that ask students to apply concepts to similar or new situations	**1**	**2**	**3**

Skill Development ***Note that every lesson/chapter may not address each of the standards/skills. Review to assure that all standards/skills are addressed throughout the book at some time. Review textbook materials to generally determine if:**			
The textbook materials provide information to the students about the skills needed to meet each standard	**1**	**2**	**3**
The textbook materials provide one or more opportunities or activities for students to practice the skills needed to meet the standard	**1**	**2**	**3**
The textbook materials provide opportunities for students to assess their own skill progress, such as personal check lists	**1**	**2**	**3**
The instructional strategies use interactive, experiential methods that actively engage students in learning to help them personalize the information, such as cooperative learning, group discussions, problem solving, demonstrations and role playing	**1**	**2**	**3**
Textbook provides objectives as well as review and reinforcement of skills and vocabulary	**1**	**2**	**3**
Textbook provides opportunities to interact with complex informational text	**1**	**2**	**3**
Accessibility and Bias **Instructional materials accessible to students address/consider:**			
Developmentally appropriate information	**1**	**2**	**3**
Varied learning abilities/disabilities	**1**	**2**	**3**
Special needs (e.g. auditory, visual, physical, speech, emotional)	**1**	**2**	**3**
English language proficiency	**1**	**2**	**3**
Different learning styles	**1**	**2**	**3**
Digital Curriculum for Students **Review digital curricular textbook materials to generally determine if:**			
There are robust digital resources for student learning, practice and assessment	**1**	**2**	**3**
Digital materials provide content that enhances the textbook	**1**	**2**	**3**
Digital materials provide differentiated access to content	**1**	**2**	**3**
Digital materials are intuitive and engaging	**1**	**2**	**3**
Assessment System **Documentation includes a description of the overall system or approach to assessment and includes:**			
Description of alignment with national/state standards and research on assessment practices	**1**	**2**	**3**
Guidance for teachers in the use of the assessments	**1**	**2**	**3**
Evidence that assessments within the textbook materials were field tested and/or evaluated	**1**	**2**	**3**
Include a variety of student assessment strategies	**1**	**2**	**3**
Are linked to relevant objectives/standards	**1**	**2**	**3**
Provide students with opportunities to demonstrate their understanding of key concepts and apply learned skills to real life or diverse situations (i.e., what students know and are able to do in new or different situations)	**1**	**2**	**3**
Provide criteria for students regarding learning targets and assessment criteria (e.g., rubric, performance checklist), and allow continuous access to evidence of progress	**1**	**2**	**3**
Incorporates multiple measures over time	**1**	**2**	**3**
Examples of assessment include:			
Selected response items (e.g., multiple choice, matching, true and false)	**1**	**2**	**3**
Performance assessments (e.g., posters, skits, role plays, PSAs, surveys, journals, letters to the editor, actual performance based assessments	**1**	**2**	**3**
Project based tasks	**1**	**2**	**3**
Portfolios	**1**	**2**	**3**

Use of Assessments **Instructional materials include assessments that provide ways to modify instruction, including:**			
Assessments used for purposes other than determining student grades	**1**	**2**	**3**
Assessments are designed to focus on learning core concepts, mastering skills, as well as evaluation	**1**	**2**	**3**
Student work informs the design or redesign of teaching strategies or sequences	**1**	**2**	**3**
Accessibility **The three key characteristics of accessible assessments:**			
The text is free from bias (e.g., gender, cultural)	**1**	**2**	**3**
Provide accommodations for individual and cultural differences	**1**	**2**	**3**
Provide accommodations for differences in learning styles and language proficiency	**1**	**2**	**3**
TOTAL SCORE PART II	**/129**		

Part III			
Work Teachers Do	**Does not meet**	**Meets**	**Exceeds**
Instructional Model The textbook's instructional model is described in the teacher's materials and supports the teacher to implement the model to organize and sequence learning experiences. Effective instructional models provide opportunities for teaching and demonstrating skills, concepts and information (essential concepts). Review the materials to determine if:			
Clear procedures are provided to assist in implementation of materials	**1**	**2**	**3**
Provide opportunities for students to extend, apply and evaluate what they have learned	**1**	**2**	**3**
Content, methodology, and teaching strategies are consistent with the curriculum's philosophies, values, and goals	**1**	**2**	**3**
Teacher's edition provides suggestions for evaluation, assessment, remediation, acceleration, feedback, and motivational techniques	**1**	**2**	**3**
The textbook materials provide guidance to the teacher regarding practicing, applying and rehearsing the skill using real life scenarios	**1**	**2**	**3**
The textbook materials provide rigorous exercises that apply concepts to similar or new situations	**1**	**2**	**3**
Essential questions are included in chapters or lessons to guide teachers in recognizing "big ideas" in the content area	**1**	**2**	**3**
Learning objectives are included in chapters or lessons to guide teachers in recognizing what students should be able to demonstrate	**1**	**2**	**3**
Effective Teaching Strategies **Instructional materials support the teacher's use of effective teaching strategies that prompt students to:**			
Actively engage in learning to help themselves to personalize information, such as through cooperative learning, group discussions, problem solving, performance and role playing	**1**	**2**	**3**
Provide feedback to their peers and reflect on their own learning	**1**	**2**	**3**
Access prior knowledge and skill abilities to further develop functional knowledge and abilities to practice and perform and creative processes	**1**	**2**	**3**
Participate and benefit from activities that expand learning opportunities outside of the classroom, such as through family activities, investigative assignments, internet review assignments, concert and performance attendance	**1**	**2**	**3**
Skill Development **Review textbook materials to generally determine if:**			
The textbook materials provide guidance to help the teacher understand the steps required to learn and teach the skill	**1**	**2**	**3**
The textbook materials provide guidance for the teacher to model the skill	**1**	**2**	**3**

CORE LEARNING

Sample Math Instructional Materials Evaluation Rubric

Name of Reviewer: _____ Title of Instructional Materials: _____

Student-Focused				
Criteria	**No Evidence (0)**	**Partial Evidence (1)**	**Strong Evidence (2)**	**Comments**
Lessons are student-centered and include productive struggle rooted in real-world problems.				
The curriculum contains guidance for structured student collaboration, student discussion, and vocabulary usage (in student text and teacher materials).				
Instructional Supports (Students, Teachers, and Families)				
Criteria	**No Evidence (0)**	**Partial Evidence (1)**	**Strong Evidence (2)**	**Comments**
The curriculum's lesson structure and pacing are effective (users could reasonably complete the content within a regular day, week, or school year).				

The curriculum includes a user-friendly teacher guide with helpful annotations, explanations, instructional strategies, examples, guiding questions, and support for ancillary materials.				
The curriculum contains various resources for multilingual learners (MLLs).				
Students and families have access to instructional support (e.g. videos for how to work with students at home).				
Technology				
Criteria	**No Evidence (0)**	**Partial Evidence (1)**	**Strong Evidence (2)**	**Comments**
Materials are iPad-compatible.				
The technology is user-friendly and easy to navigate for students and families.				

The technology is user-friendly and easy to navigate for teachers.				
Print and digital content are comparable and fully aligned to instruction, practice, and assessments.				
Practice and Assessment				
Criteria	**No Evidence (0)**	**Partial Evidence (1)**	**Strong Evidence (2)**	**Comments**
The curriculum provides various opportunities for students to practice and demonstrate their understanding, and assessments are fully aligned with instruction.				
The provided assessments include a bank of options (both print and online) and incorporate a variety of question types (similar to the state assessments).				
Practice/assessment materials include spiraling (both print and online).				

Practice and Assessment				
Criteria	No Evidence (0)	Partial Evidence (1)	Strong Evidence (2)	Comments
The curriculum contains common vocabulary/ language across grade levels.				
The curriculum displays connections to previous and future grade-level expectations.				

WASD Math Textbook Adoption Evaluation Rubric

Name of Reviewer _____ School/ _____ Date _____

Name of Curriculum Materials _____ Subject _____ Grade Level(s) _____

Rubric for answering questions about Overarching Considerations:

0 points- Not Found (N) – The curriculum materials do not support this element.

1 point- Low (L) – The curriculum materials contain limited support for this element; the support is not embedded or consistently present within resource(s)

2 Points- Medium (M) – The curriculum materials contain support for this element, but it is not always embedded or consistently present within resource(s).

3 Points- High (H) – The curriculum materials contain embedded support for this element so that it is consistently present within resource(s).

Questions about Overarching Considerations	See Rubric	Comments/Examples
Alignment: To what extent do the materials…	0, 1, 2, 3	
1. Provide alignment with the PA Common Core Standards/Keystone Assessment Anchors/Eligible Content/ National Standards?		
2. Address the grade level(s) or course level of course(s)?		
3. Support the needs of the course(s) being taught using the Science of Math?		
Questions about Overarching Considerations	**See Rubric**	**Comments/Examples**
Differentiation: To what extent do the materials…	0, 1, 2, 3	
4. Provide teachers with strategies for meeting the needs of a range of learners?		
5. Provide instructional support to help teachers sequence or scaffold lessons so that students move from what they know to what they do not know?		
6. Provide opportunities for struggling students to review materials and remediate content not secured?		
7. Provide opportunities for advanced students to investigate content at greater depth?		
Questions about Overarching Considerations	**See Rubric**	**Comments/Examples**
Content/Research: To what extent do the materials…	0, 1, 2, 3	

8. Support the development of students' proficiency with procedural skills?		
9. Include student activities that build on each other within and across grades in a logical way that supports understanding/procedural skills?		
10. Provide opportunities to spend sufficient time with application problems within lessons?		
11. Provide opportunities for practicing mathematical fluency?		
Questions about Overarching Considerations	**See Rubric**	**Comments/Examples**
Supplementals: To what extent do the materials…	0, 1, 2, 3	
12. Encourage teachers to draw on multiple resources within the program to facilitate learning?		
13. Include essential learning materials, handouts, student, and teacher text, and other instructional tools necessary to achieve the provided or indicated learning objectives?		
14. Offer multiple Professional Development opportunities for teachers when implementing this text(s)/program?		
Questions about Overarching Considerations	**See Rubric**	**Comments/Examples**
Assessment: To what extent do the materials…	0, 1, 2, 3	
15. Include accompanying assessments of student learning (such as homework, observation checklists, portfolio recommendations, extended tasks, tests, and quizzes) that provide evidence regarding students' proficiency?		
16. Provide strategies for gathering information about students' prior knowledge of mathematical background and vocabulary?		
17. Provide strategies for teachers to identify common student errors and misconceptions?		
18. Assess students at a variety of knowledge levels (e.g., memorization, understanding, reasoning, problem solving)?		
19. Provide summative assessments for teacher use?		

20. Encourage students to monitor their own progress?		
21. Provide opportunities for ongoing review and practice with feedback related to learning concepts, and skills?		
22. Provide support for a varied system of on-going formative and summative assessment (formal or informal observations, interviews, surveys, performance assessments, target problems)?		
Questions about Overarching Considerations	**See Rubric**	**Comments/Examples**
Organization: To what extent do the materials…	0, 1, 2, 3	
23. Include Essential Questions in the chapter or lesson to guide students in recognizing "big ideas"?		
24. Contain illustrations, graphs, charts, and/or demonstrations that are current, correlated, and accurate and are presented in a variety of formats?		
25. Include learning objectives in chapters or lessons to guide students in recognizing what they should be able to demonstrate?		
26. Include a well-organized, easy to use and comprehensive teacher's edition?		
Questions about Overarching Considerations	**See Rubric**	**Comments/Examples**
Accessibility:	0, 1, 2, 3	
27. The text is free from bias (e.g. gender, cultural).		
28. The text provides accommodations for individual and cultural differences.		
29. The text provides accommodations for differences in language proficiency.		
Questions about Overarching Considerations	**See Rubric**	**Comments/Examples**
Technology: To what extent do the digital materials…	0, 1, 2, 3	
30. Addresses the grade level(s) or course level of course(s)?		

31. Provide content that enhances instruction and assessment?		
32. Provide content supports for teachers to further develop expertise?		
33. Integrate technology such as interactive tools, virtual manipulatives/objects, and software that engages students?		
34. Include or reference technology that provides opportunities for teachers and/or students to communicate with each other (e.g. websites, discussion groups, webinars, homework submission)?		
35. Include technology resources to assist and engage students?		
36. Include opportunities to assess student content understandings and knowledge of procedural skills using technology?		
37. Include or reference technology that provides teachers additional materials to differentiate instruction for students?		
38. Include teacher guidance for the mindful use of embedded technology to support and enhance student learning?		
39. Include an Online platform that is easy to access and accessible when needed (speed, accessibility, ease of navigation)?		
40. Include an Online platform that is user-friendly and engaging to the student?		
Questions about Overarching Considerations	**See Rubric**	**Comments/Examples**
References:	0, 1, 2, 3	
41. Customer service is reliable and questions, feedback and assistance can be made frequently and in a timely and appropriate manner.		
Overall Evaluation:	**Total Points** _____/ 123	**Additional Comments:**