

Endorsement Competencies for Mathematics 5-12

| 2007 Standards for Mathematics |
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| 1.0 Common Core—Mathematical Problem Solving: <i>Teachers know, understand, and apply the process of mathematical problem solving.</i> |
| 1.1 Apply and adapt a variety of appropriate strategies to solve problems. |
| 1.2 Solve problems that arise in mathematics and those involving mathematics in other contexts. |
| 1.3 Build new mathematical knowledge through problem solving. |
| 1.4 Monitor and reflect on the process of mathematical problem solving. |
| 2.0 Common Core—Reasoning and Proof: <i>Teachers reason, construct, and evaluate mathematical arguments and interpret and compare mathematical information from a variety of sources.</i> |
| 2.1 Recognize reasoning and proof as fundamental aspects of mathematics. |
| 2.2 Make and investigate mathematical conjectures. |
| 2.3 Develop and evaluate mathematical arguments and proofs. |
| 2.4 Select and use various types of reasoning and methods of proof. |
| 3.0 Common Core—Mathematical Communication: <i>Teachers communicate their mathematical thinking orally and in writing, using appropriate mathematical language and notation to clearly and effectively express or present ideas and information.</i> |
| 3.1 Systematically gather mathematical information for a given purpose and clearly communicate their findings to peers, faculty, and others. |
| 3.2 Use the language of mathematics to express ideas precisely. |
| 3.3 Use communication as a means of clarifying and organizing one’s own mathematical thinking. |
| 3.4 Analyze and evaluate the mathematical thinking and strategies of others. |
| 4.0 Common Core—Mathematical Connections: <i>Teachers recognize, use, and make connections between and among mathematical ideas and in contexts outside mathematics to build mathematical understanding.</i> |
| 4.1 Recognize and use connections among mathematical ideas. |
| 4.2 Recognize and apply mathematical ideas to other subject areas and to real-world situations. |
| 4.3 Demonstrate how mathematical ideas interconnect and build on one another to produce a coherent whole. |
| 5.0 Common Core—Mathematical Representation: <i>Teachers use varied representations (words, pictures, data representations) of mathematical ideas to support and deepen mathematical understanding.</i> |
| 5.1 Use multiple representations to model and interpret physical, social, and mathematical phenomena. |

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| 5.2 Create and use representations to organize, record, and communicate mathematical ideas. |
| 5.3 Select, apply, and translate among mathematical representations to solve problems. |
| 6.0 Common Core—Technology: <i>Teachers embrace technology as an essential tool for teaching and learning mathematics.</i> |
| 6.1 Use knowledge of mathematics to select and use appropriate technological tools, such as but not limited to, spreadsheets, dynamic graphing tools, computer algebra systems, dynamic statistical packages, graphing calculators, data-collection devices, and presentation software. |
| 6.2 Understand the appropriate use of technology to experiment, visualize, and make/explore conjectures. |
| 7.0 Common Core—Number and Operation: <i>Teachers demonstrate computational proficiency, including a conceptual understanding of numbers, ways of representing number, relationships among number and number systems, and meanings of operations.</i> |
| 7.1 Analyze and explain the mathematics that underlies the procedures involving operations with whole numbers, integers, rational, real, and complex numbers. |
| 7.2 Recognize the meaning and use of place value in representing whole numbers and finite decimals, comparing and ordering numbers, and understanding the relative magnitude of numbers. |
| 7.3 Demonstrate proficiency in multi-digit computation using algorithms, mental mathematics, and computational estimation. |
| 7.4 Provide equivalent representations of fractions, decimals, and percents. |
| 7.5 Create, solve, and use proportions. |
| 7.6 Apply the fundamental ideas of number theory. |
| 7.7 Make sense of large and small numbers and use scientific notation. |
| 7.8 Compare and contrast properties of numbers and number systems. |
| 7.9 Represent, use, and apply properties of complex numbers. |
| 7.10 Recognize matrices and vectors as systems that have some of the properties of the real number system. |
| 7.11 Demonstrate knowledge of the historical development of number and number systems, including contributions from many cultures. |
| 8.0 Common Core—Algebra <i>Teachers understand relationships among quantities including functions, ways of representing mathematical relationships, and the analysis of change.</i> |
| 8.1 Explore, predict, analyze, and represent patterns, relations, and functions. |
| 8.2 Apply fundamental ideas of linear algebra. |
| 8.3 Investigate equality, equations, inequalities, and proportional relationships. |
| 8.4 Use mathematical models including technological tools to represent and understand quantitative relationships. |
| 8.5 Analyze the concept of change in various contexts. |
| 8.6 Demonstrate knowledge of the historical development of algebra, including contributions from many cultures. |

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| 9.0 Common Core—Geometry: <i>Teachers use spatial visualization and geometric modeling to explore and analyze geometric figures, structures, and their properties.</i> |
| 9.1 Demonstrate knowledge of core concepts and principles of Euclidean and non-Euclidean geometries in two and three dimensions from both formal and informal perspectives. |
| 9.2 Exhibit knowledge of the role of axiomatic systems and proofs in geometry. |
| 9.3 Analyze characteristics and relationships of geometric objects and figures. |
| 9.4 Build and manipulate representations of two- and three- dimensional objects using concrete models, drawings, and dynamic geometry software, and perceive an object from different perspectives. |
| 9.5 Specify locations and describe spatial relationships using coordinate geometry, vectors, and other representational systems. |
| 9.6 Apply transformations and use symmetry, similarity, and congruence in mathematical situations. |
| 9.7 Demonstrate knowledge of the historical development of Euclidean and non-Euclidean geometries, including contributions from many cultures. |
| 10.0 Common Core—Data Analysis, Statistics, and Probability: <i>Teachers demonstrate an understanding of concepts and practices related to data analysis, statistics, and probability.</i> |
| 10.1 Design investigations, collect data, use a variety of ways to display data, interpret data representations and draw and represent conclusions that may include bivariate data and geometric probability. |
| 10.2 Use appropriate methods such as random sampling or random assignment of treatments to estimate population characteristics, test conjectured relationships among variables, and analyze data. |
| 10.3 Use appropriate statistical methods and technological tools to describe shape and analyze spread and center. |
| 10.4 Use statistical inference to draw conclusions from data. |
| 10.5 Identify misuses of statistics and invalid conclusions from probability. |
| 10.6 Draw conclusions involving uncertainty by using hands-on and technology-based simulation for estimating probabilities and gathering data to make inferences and decisions. |
| 10.7 Demonstrate knowledge of the historical development of statistics and probability, including contributions from many cultures. |
| 11.0 Common Core—Measurement: <i>Teachers apply and use measurement concepts and tools.</i> |
| 11.1 Recognize the common representations and uses of measurement and choose tools and units for measuring. |
| 11.2 Identify the attributes to be measured and apply appropriate techniques, tools, and formulas to determine measurements and their application in a variety of contexts. |
| 11.3 Use estimation as a way of understanding measurement units and processes. |
| 11.4 Demonstrate knowledge of the historical development of measurement including contributions from many cultures. |
| 12.0 Common Core—Calculus: <i>Teachers demonstrate a conceptual understanding of and procedural facility with basic calculus concepts.</i> |

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| 12.1 Demonstrate a conceptual understanding of limit, continuity, differentiation, and integration and a thorough background in the techniques and application of the calculus. |
| 12.2 Apply concepts of function, geometry, and trigonometry in solving problems involving calculus. |
| 12.3 Use the concepts of calculus and mathematical modeling to represent and solve problems taken from real-world contexts. |
| 12.4 Use technological tools to explore and represent fundamental concepts of calculus. |
| 12.5 Demonstrate knowledge of the historical development of calculus, including contributions from many cultures. |
| 13.0 Common Core—Discrete Mathematics: <i>Teachers apply the fundamental ideas of discrete mathematics in the formulation and solution of problems.</i> |
| 13.1 Demonstrate knowledge of basic elements of discrete mathematics such as graph theory, recurrence relations, finite difference approaches, linear programming, and combinatorics. |
| 13.2 Apply the fundamental ideas of discrete mathematics in the formulation and solution of problems arising from real-world situations. |
| 13.3 Use technological tools to solve problems involving the use of discrete structures and the application of algorithms. |
| 13.4 Demonstrate knowledge of the historical development of discrete mathematics, including contributions from many cultures. |
| 14.0 Common Core—Instructional Methodology: <i>Teachers possess a deep understanding of how students learn mathematics and of the pedagogical knowledge specific to mathematics teaching and learning.</i> |
| 14.1 Select, use, and determine suitability of the wide variety of available mathematics curricula and teaching materials for all students including those with special needs such as the gifted, challenged and speakers of other languages. |
| 14.2 Select and use appropriate concrete materials for learning mathematics. |
| 14.3 Use multiple strategies, including listening to and understanding the ways students think about mathematics, to assess students' mathematical knowledge and provide appropriate interventions. |
| 14.4 Plan lessons, units and courses that address Washington Essential Academic Learning Requirements (EALRs), Grade-Level Expectations (GLEs), and WASL item specifications. |
| 14.5 Demonstrate knowledge of research results in the teaching and learning of mathematics, and use print and online resources of professional mathematics organizations. |
| 14.6 Use knowledge of different types of instructional strategies, including differentiation, in planning mathematics lessons. |
| 14.7 Demonstrate ability to present mathematical concepts using multiple representations (e.g., numerical, graphical, analytical, contextual) to address the multiple learning styles of students |
| 14.8 Demonstrate the ability to use student discourse to lead classes in mathematical problem solving and develop in-depth conceptual understanding to help students |

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| develop and test generalizations. |
| 14.9 Develop lessons that use technology's potential for building understanding of mathematical concepts and developing important mathematical ideas. |
| 14.10 Demonstrate a positive impact on student learning of mathematics. |
| 14.11 Engage in culturally responsive teaching of mathematics. |
| 14.12 Assure and support equity in the classroom, with equal access to and continued study of mathematics for all students. |