

Mathematical Reasoning and Communication

Students will reason mathematically to solve problems and communicate with others.

Mathematical Reasoning and Communication Performance Indicators

K-2	3-5	6-8	9-12
<p>A. Observe, identify and analyze situations in order to ask questions and understand and describe problems. (MP1,2)</p> <p>B. Select strategies and appropriate tools to develop and implement a plan to solve a problem. (MP1,5)</p> <p>C. Reflect on the reasonableness of the solution to a problem. (MP1,6)</p> <p>D. Evaluate, justify, and defend the relative effectiveness of problem solving processes using logical argument. (MP1,3)</p> <p>E. Precisely communicate mathematical understandings and connections using a variety of representations. (MP1)</p>	<p>A. Observe, identify and analyze situations in order to ask questions and understand and describe problems. (MP1,2)</p> <p>B. Select strategies and appropriate tools to develop and implement a plan to solve a problem. (MP1,5)</p> <p>C. Reflect on the reasonableness of the solution to a problem. (MP1,6)</p> <p>D. Evaluate, justify, and defend the relative effectiveness of problem solving processes using logical argument. (MP 1,3)</p> <p>E. Precisely communicate mathematical understandings and connections using a variety of representations. (MP1)</p>	<p>A. Observe, identify and analyze situations in order to ask questions and understand and describe problems. (MP1,2)</p> <p>B. Select strategies and appropriate tools to develop and implement a plan to solve a problem. (MP1,5)</p> <p>C. Reflect on the reasonableness of the solution to a problem. (MP1,6)</p> <p>D. Evaluate, justify, and defend the relative effectiveness of problem solving processes using logical argument. (MP 1,3)</p> <p>E. Precisely communicate mathematical understandings and connections using a variety of representations. (MP1)</p>	<p>A. Observe, identify and analyze situations in order to ask questions and understand and describe problems. (MP1,2)</p> <p>B. Select strategies and appropriate tools to develop and implement a plan to solve a problem. (MP1,5)</p> <p>C. Reflect on the reasonableness of the solution to a problem. (MP1,6)</p> <p>D. Evaluate, justify, and defend the relative effectiveness of problem solving processes using logical argument. (MP1,3)</p> <p>E. Precisely communicate mathematical understandings and connections using a variety of representations. (MP1)</p>

Modeling

Students will choose the appropriate mathematics to describe, understand and analyze real-world situations.

Modeling Performance Indicators

K-2	3-5	6-8	9-12
<p>A. Create an appropriate model using numbers, quantities, and other representations to describe a relationship in a real-world situation. (MP4)</p> <p>B. Compare and critique different models for a real-world situation. (MP4)</p> <p>C. Apply models to real-world situations. (MP4)</p> <p>D. Interpret the results of a mathematical model in the context of the original real-world situation. (MP4)</p>	<p>A. Create an appropriate model using numbers, quantities, and other representations to describe a relationship in a real-world situation. (MP4)</p> <p>B. Compare and critique different models for a real-world situation. (MP4)</p> <p>C. Apply models to real-world situations. (MP4)</p> <p>D. Interpret the results of a mathematical model in the context of the original real-world situation. (MP4)</p>	<p>A. Create an appropriate model using numbers, quantities, and other representations to describe a relationship in a real-world situation. (MP4)</p> <p>B. Compare and critique different models for a real-world situation. (MP4)</p> <p>C. Apply models to real-world situations (MP4)</p> <p>D. Interpret the results of a mathematical model in the context of the original real-world situation and adjust the model as needed. (MP4)</p>	<p>A. Create an appropriate model using numbers, quantities, and other representations to describe a relationship in a real-world situation. (MP4)</p> <p>B. Compare and critique different models for a real-world situation. (MP4)</p> <p>C. Apply models to real-world situations. (MP4)</p> <p>D. Interpret the results of a mathematical model in the context of the original real-world situation and adjust the model as needed. (MP4)</p>

Number and Quantity

Students will reason, describe, and analyze quantitatively using number and units to solve problems.

Number and Quantity Performance Indicators

K-2	3-5	6-8	9-12
<p>A. Use counting to identify quantities. (K.CC.1, 2, 4, 5, 6; 1.NBT.1; 2.OA.3; 2.NBT.2)</p> <p>B. Explain and make generalizations about the patterns in the place value system. (K. NBT.1; 1.NBT.2, 3; 2.NBT.1, 2, 3, 4)</p> <p>C. Perform single and multi-digit addition and subtraction with whole numbers using understanding of place value and the properties of operations. (K.OA.2, 5; 1.OA.5, 6, 8; 1.NBT.4, 5, 6; 2.OA.2; 2.NBT.5, 6, 7, 8, 9)</p> <p>D. Solve problems with addition and subtraction involving measurement concepts.. (K.MD.2 ; 1.MD.A.3; 2.MD.5, 6, 7, 8)</p>	<p>A. Explain and make generalizations about the patterns in the place value system. (4.NBT.1, 2; 5.NBT.1, 2, 3)</p> <p>B. Perform single and multi-digit arithmetic with the four operations with whole numbers and decimals using understanding of place value and the properties of operations. (3.OA.1, 2, 5, 7; 3.NBT.1, 2, 3; 4.NBT.4, 5, 6; 5.OA.1; 5.NBT.4, 5, 6, 7)</p> <p>C. Solve problems using all four operations involving measurement concepts. (3.MD.1; 4.MD.1, 2; 5.MD.1)</p> <p>D. Construct meaning of fractions as numbers, equate fractions to decimal notation, and apply operations using fractions based upon previous understanding of operations with whole numbers. (3.NF.1, 2, 3 ; 3.G.2; 4.NF. 1, 2, 3, 4, 5, 6, 7; 5.NF.1, 2, 3, 4, 5, 6, 7)</p>	<p>A. Compute fluently with multi-digit numbers and find common factors and multiples. (6.NS. 2, 3, 4)</p> <p>B. Apply and extend previous understandings of the set of rational numbers, including integers. (6NS.5, 6, 7, 8)</p> <p>C. Apply and extend previous understandings of operations with rational numbers. (6.NS.1; 7NS.1, 2, 3; 7.EE.3)</p> <p>D. Identify irrational numbers and approximate them with rational numbers. (8NS.1, 2; 8.EE.1, 2, 3)</p>	<p>A. Use properties of rational and irrational numbers and properties of exponents (including rational exponents). (HSN.RN.A,B)</p> <p>B. Reason quantitatively and use units to solve problems. (HSN.Q.A)</p> <p>C. Perform arithmetic operations and solve equations using complex numbers. (HSN.CN.A.1,2,; HSN.CN.C.7)</p>

Functions & Algebraic Reasoning

Students will create, interpret, use, and analyze expressions, equations and inequalities including recognizing when a relationship is a function and evaluating that function.

Functions & Algebraic Reasoning Performance Indicators

K-2	3-5	6-8	9-12
<p>A. Represent and solve problems involving addition and subtraction (of all problem types). (K.OA.1, 2, 3, 4; 1.OA.1, 2; 2.OA.1)</p> <p>B. Apply the properties of operations and equality to solve problems. (1.OA.3, 7, 8)</p> <p>C. Explain the relationship between addition and subtraction. (1.OA.4, 8)</p> <p>D. Observe and identify patterns and relationships. (K.CC.1, 2, 3; K.NBT.1; 1.NBT.1, 2, 3; 2.OA.3; 2.NBT.1, 2, 3, 4)</p>	<p>A. Represent and solve problems involving all four operations (of all problem types). (3.OA.3, 8; 4.OA.1, 2, 3)</p> <p>B. Apply the properties of operations and equality to solve problems. (3.OA.4)</p> <p>C. Explain the relationship between multiplication and division. (3.OA.4, 6)</p> <p>D. Generate, analyze, and explain numerical patterns and relationships. (3.OA.9; 4.OA.4, 5; 5.OA.3; 5.NBT.2)</p>	<p>A. Use properties of operations to create and evaluate equivalent expressions. (6.EE.1,2, 3, 4; 7.EE.1, 2; 8.EE.1, 2, 4)</p> <p>B. Create and solve equations and inequalities in mathematical and real world problems. (6.EE.5, 7, 8, 9; 7.EE.3, 4)</p> <p>C. Analyze proportional relationships and use them to solve real-world and mathematical problems. (6.RP.1, 2, 3; 7.RP.1, 2, 3; 7.G.1; 8.EE.5)</p> <p>D. Understand and analyze ratio concepts & use ratio reasoning to solve problems. (6.RP.1, 2, 3; 7.RP.1, 2, 3)</p> <p>E. Analyze, graph and solve linear equations and pairs of simultaneous linear equations to solve problems. (8.EE.6, 7, 8)</p> <p>F. Identify and compare functions. (8.F.1, 2, 3)</p> <p>G. Use functions to model relationships between two quantities. (8.F.4, 5)</p>	<p>A. Look for, interpret, and/or make use of structure in expressions and equations. (HSA.SSE.B; HSA.APR.A; HSA.APR.D.6)</p> <p>B. Analyze equations and make connections to key features of their graphs. (HSA.REI.D.1; HSF.IF.C.7; HSF.IF.B4)</p> <p>C. Solve equations and inequalities symbolically and justify a solution method. (HSA.REI.B)</p> <p>D. Represent and solve equations and inequalities graphically. (HSA.REI.D)</p> <p>E. Interpret and identify functions that arise in applications in terms of the context. (HSF.IF.B)</p> <p>F. Analyze functions using multiple representations (HSF.IF.C; HSF.TF)</p> <p>G. Build a function that describes a relationship between two quantities. (HSF.BF.A)</p>

Geometry and Measurement

Students will apply concepts of geometry, spatial reasoning, and measurement in the context of real world problems.

Geometry and Measurement Performance Indicators

K-2	3-5	6-8	9-12
<p>A. Describe and compare measurable attributes. (K.MD.1, 2; 1.MD.1)</p> <p>B. Create, identify, and distinguish between shapes based on their defining attributes. (K.G.1, 2, 3, 4, 5, 6; 1.G.1, 2; 2.G.1)</p> <p>C. Use appropriate tools to measure. (1.MD.2, 3; 2.MD.1, 2, 3, 4, 7, 8)</p>	<p>A. Graph points on the coordinate plane to solve real-world and mathematical problems. (5.G.1, 2)</p> <p>B. Create, identify, distinguish, and classify 2D and 3D geometric figures based on their properties. (3.G.1; 4.G.1, 2, 3; 5.G.3, 4)</p> <p>C. Apply understanding of geometric measurement (angles, perimeter, area and volume) to solve real world problems. (3.MD.C.5, 6, 7; 4.MD.3, 5, 6, 7; 5.MD.3, 4, 5)</p> <p>D. Solve problems using measurement and estimation (3.MD.1, 3; 4.MD.1, 2)</p>	<p>A. Use transformations to demonstrate congruence and similarity. (8.G.1, 2, 3, 4, 5)</p> <p>B. Analyze and justify the Pythagorean Theorem and its converse and apply the Pythagorean Theorem to solve problems. (8.G.6, 7, 8)</p> <p>C. Apply understanding of geometric figures and measurement (angles, length, area, surface area, and volume) to solve real world problems. (6.G.1, 2, 3, 4; 7.G.1, 2, 3, 4, 5, 6; 8.G.9)</p>	<p>A. Use transformations to define congruence and similarity. (HSG.CO.A,B,D; HSG.SRT.A)</p> <p>B. Apply congruence and similarity in terms of transformations to prove geometric theorems. (HSG.CO.C; HSG.SRT.B.4)</p> <p>C. Use geometric properties and theorems to solve problems. (HSG.SRT.B.5,6,7,8; HSG.SRT.C; HSG.C.1,2,3, B.5; HSG.GPE.B.4,5,7)</p> <p>D. Apply coordinate geometry to solve problems involving segments, circles, and parabolas. (HSG.GPE.A.1,2; B.6)</p> <p>E. Apply measurement formulas to solve problems involving two- and three-dimensional objects. (HSG.GMD.A; HSG.GMD.B)</p> <p>F. Apply right triangle trigonometry. (HSG.SRT.C.6)</p>

Data, Statistics, and Probability

Students will apply principles of statistics and probability to analyze and interpret data, reach and justify conclusions and make inferences and predictions.

Data, Statistics, and Probability Performance Indicators

K-2	3-5	6-8	9-12
<p>A. Classify, organize and represent data. (K.MD.3; 1.MD.4; 2.MD.9, 10)</p> <p>B. Interpret and use information from data sets to solve problems. (1.MD.4; 2.MD.10)</p>	<p>A. Classify, organize and represent data. (3.MD.3, 4; 4.MD.4; 5.MD.2)</p> <p>B. Interpret and use information from data sets to solve problems. (3.MD.3; 4.MD.4; 5.MD.2)</p>	<p>A. Organize and represent data. (6.SP.4; 8.SP.1, 2, 4)</p> <p>B. Summarize, describe and make inferences about distributions of data. (6.SP.2, 3, 5; 7.SP.3, 4; 8.SP.1, 3, 4)</p> <p>C. Use random sampling to draw inferences about a population. (7.SP.1, 2)</p> <p>D. Develop, use, and evaluate probability models. (7.SP.1, 2, 3, 4)</p>	<p>A. Summarize, represent, and interpret data. (HSS.ID.A; HSS.ID.B; HSS.ID.C)</p> <p>B. Use data to make inferences and justify conclusions from sample surveys, experiments, and observational studies. (HSS.IC.A; HSS.IC.B)</p> <p>C. Use the rules of probability to compute probabilities. (HSS.CP.A; HSS.CP.B.6,7)</p>