

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

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
A. Create an appropriate model using numbers, quantities, and other representations to describe a relationship in a real-world situation. (MP4)	A. Create an appropriate model using numbers, quantities, and other representations to describe a relationship in a real-world situation. (MP4)	A. Create an appropriate model using numbers, quantities, and other representations to describe a relationship in a real-world situation. (MP4)	A. Create an appropriate model using numbers, quantities, and other representations to describe a relationship in a real-world situation. (MP4)
B. Compare and critique different models for a real-world situation. (MP4)	B. Compare and critique different models for a real-world situation. (MP4)	B. Compare and critique different models for a real-world situation. (MP4)	B. Compare and critique different models for a real-world situation. (MP4)
C. Apply models to real-world situations. (MP4)	C. Apply models to real-world situations. (MP4)	C. Apply models to real-world situations (MP4)	C. Apply models to real-world situations. (MP4)
D. Interpret the results of a mathematical model in the context of the original real-world situation. (MP4)	D. Interpret the results of a mathematical model in the context of the original real-world situation. (MP4)	D. Interpret the results of a mathematical model in the context of the original real-world situation and adjust the model as needed. (MP4)	D. Interpret the results of a mathematical model in the context of the original real-world situation and adjust the model as needed. (MP4)

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. (6NS. 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.MD1, 3; 4MD1, 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; HS.GSRT.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. (6SP.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. (7SP.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>