CMAS Grade 6 Mathematics Performance Level Descriptors

(Based on PARCC)

In 2018, Colorado will continue to use the performance level descriptors (PLDs) that were developed in collaboration with the Partnership for Assessment of Readiness for College and Careers (PARCC) consortium to describe performance on the CMAS assessments.

	Grade 6 Math : Sub-Claim A The student solves problems involving the Major Content for grade/course with connections to the Standards for Mathematical Practice.			
	Level 5: Exceeded Expectations	**Level 4: Met Expectations**	**Level 3: Approached Expectations**	**Level 2: Partially Met Expectations**
Multiplying and Dividing with Fractions 6.NS.1-2	Solves word problems involving **division of fractions by fractions.**	Divides fractions **with unlike denominators** and solves word problems with prompting embedded within the problem.	Divides fractions with common denominators **and solves word problems with prompting embedded within the problem.**	Divides fractions with common denominators.
Ratios 6.RP.1 6.RP.2 6.RP.3a 6.RP.3b 6.RP.3c-1 6.RP.3c-2 6.RP.3d	Uses ratio and rate reasoning to solve real-world and mathematical problems, including ratio, unit rate, percent and unit conversion problems. Uses **and connects a variety of representations** and strategies to solve these problems. Finds missing values in tables and plots values on the coordinate plane.	Uses ratio and rate reasoning to solve **real-world** and mathematical problems, including ratio, unit rate, percent and unit conversion problems using a limited variety of representations and strategies. Finds missing values in tables and locates **and** plots values on the coordinate plane.	**Uses ratio and rate reasoning** to solve mathematical problems, including ratio, unit rate, percent and unit conversion problems using a limited variety of representations and strategies. **Finds missing values in tables and locates or plots values on the coordinate plane.**	Solves problems including ratio, unit rate, percent and unit conversion problems using a limited variety of representations and strategies.
Rational Numbers 6.NS.5 6.NS.6a 6.NS.6b-1 6.NS.6b-2 6.NS.6c-1 6.NS.6c-2	Understands that positive and negative numbers describe mathematical or real-world quantities which have opposite values or directions and can be represented on a number line and compared with or without the use of a number line.	Understands that positive and negative numbers describe mathematical or real-world quantities which have opposite values or directions and can be represented on a number line **and compared with or without the use of a number line.**	Understands that positive and negative numbers describe mathematical or real-world quantities which have opposite values or directions and can be represented on a number line.	Understands that positive and negative numbers describe mathematical or real-world quantities which have opposite values or directions and can be represented on a number line.

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6.NS.7a 6.NS.7b 6.NS.7c-1 6.NS.7c-2 6.NS.7d	Understands **and interprets** the absolute value of a rational number.	**Understands** the absolute value of a rational number.	Determines the absolute value of a rational number.	Determines the absolute value of a rational number.
6.NS.8	Plots ordered pairs on a coordinate plane to solve real-world and mathematical problems. Understands **(or recognizes) that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.** **Distinguishes comparisons of absolute value from statements about order.**	Plots ordered pairs on a coordinate plane to solve **real-world and** mathematical problems.	**Locates or plots ordered pairs on a coordinate plane to solve mathematical problems.**	
Expressions and Inequalities 6.EE.1-1 6.EE.1-2 6.EE.2a 6.EE.2b 6.EE.2c-1 6.EE.2c-2 6.EE.4	**Writes,** reads and evaluates numerical and algebraic expressions, including those that contain whole number exponents. Identifies parts of algebraic and numerical expressions using mathematical terms **and views one or more parts of an**	Reads and **evaluates** numerical and algebraic expressions, including those that contain whole number exponents. **Writes numerical expressions and some algebraic expressions, including those that contain whole number exponents.** Identifies parts of algebraic and numerical expressions using mathematical terms.	**Reads numerical and algebraic expressions including those that contain whole number exponents**. Identifies parts of algebraic **and** numerical expressions using mathematical terms.	Identifies parts of an algebraic or numerical expression using mathematical terms.

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	expression as a single entity. Identifies equivalent expressions using properties of operations.	**Identifies equivalent expressions using properties of operations.**		
Equations and Inequalities 6.EE.5-1 6.EE.5-2 6.EE.6 6.EE.7 6.EE.8 6.EE.9	Uses variables to represent numbers and writes expressions and single-step equations to solve real-world and mathematical problems **and understand their solutions.** **Expresses a relationship between dependent and independent variables** and relates tables and graphs to equations. Writes and graphs inequalities to represent a constraint or condition in a real-world or mathematical problem. **Understands that there are an infinite number of solutions for an inequality.**	Uses variables to represent numbers and writes expressions and single-step equations to solve **real-world** or mathematical problems. Relates tables and graphs to the equations. **Writes** and graphs inequalities to represent a constraint or condition in a **real-world** or mathematical problem.	Uses variables to represent numbers and writes expressions without exponents, and single-step equations to solve mathematical problems. **Relates tables and graphs to the equations.** **Graphs inequalities to represent a constraint or condition in a mathematical problem.**	Uses variables to represent numbers and writes expressions without exponents, and single-step equations to solve mathematical problems

	Grade 6 Math: Sub-Claim B The student solves problems involving the Additional and Supporting Content for the grade/course with connections to the Standards for Mathematical Practice.			
	Level 5: Exceeded Expectations	**Level 4: Met Expectations**	**Level 3: Approached Expectations**	**Level 2: Partially Met Expectations**
Factors and Multiples 6.NS.4-1 6.NS.4-2	Finds greatest common factors and least common multiples. Uses the distributive property to **express** a sum of two whole	Finds greatest common factors and least common multiples. **Uses the distributive property to rewrite a sum of two whole**	Identifies greatest common factors **and** least common multiples.	Identifies greatest common factors or least common multiples.

	Grade 6 Math: Sub-Claim B The student solves problems involving the Additional and Supporting Content for the grade/course with connections to the Standards for Mathematical Practice.			
	Level 5: Exceeded Expectations	**Level 4: Met Expectations**	**Level 3: Approached Expectations**	**Level 2: Partially Met Expectations**
	numbers 1-100 with a common factor as a multiple of a sum of two whole numbers with no common factor.	**numbers 1-100 with a common factor as a multiple of a sum of two whole numbers with no common factor.**		
Geometry 6.G.1 6.G.2-1 6.G.2-2 6.G.3 6.G.4	Solves real-world and mathematical problems involving area of polygons by composing into rectangles or decomposing into triangles and other shapes. Determines measurements of polygons in the coordinate plane. Determines and uses nets of three-dimensional figures to find surface area. Determines volume of right rectangular prisms with fractional edge lengths by packing them with unit cubes and using formulas. **Uses volume formulas to find unknown measurements.** **Understands the concepts of area and volume to solve unscaffolded problems.**	Solves **real-world** and mathematical problems involving area of polygons by either composing into rectangles or decomposing into triangles and other shapes. Determines measurements of polygons in the coordinate plane. **Determines** and uses nets of three-dimensional figures to find surface area. Determines volume of right rectangular prisms with fractional edge lengths by packing them with unit cubes and using formulas.	Solves mathematical problems involving area of polygons by either composing into rectangles **or decomposing into triangles and other shapes.** **Determines measurements of polygons in the coordinate plane.** **Uses nets of three-dimensional figures to find surface area.** **Determines volume of right rectangular prisms with fractional edge lengths by packing them with unit cubes and using formulas.**	Solves mathematical problems involving area of polygons by composing into rectangles.
Statistics and Probability 6.SP.1 6.SP.2 6.SP.3	Recognizes a statistical question and understands that a set of collected data has a distribution which can be described by its center, spread and overall shape.	Recognizes a statistical question and understands that a set of collected data has a distribution which can be described by its center, spread and overall shape.	**Recognizes a statistical question** and understands that a set of collected data has a distribution which can be described by its center, spread and overall shape.	Understands that a set of collected data has a distribution which can be described by its center, spread and overall shape.

	Grade 6 Math: Sub-Claim B The student solves problems involving the Additional and Supporting Content for the grade/course with connections to the Standards for Mathematical Practice.			
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6.SP.4 6.SP.5	Understands the purpose of center and variability and that it can be summarized with a single number. **Displays** numerical data in plots on a number line, including dot plots, histograms and box plots, and **determines which display is the most appropriate.** **Summarizes numerical data sets in relation to their context, such as by reporting the number of observations, describing the nature of the attributes under investigation and using measures of center and variability.** **Determines which measures of center and variability are the most appropriate for a set of data.**	Understands the purpose of center and that it can be summarized with a single number.	Understands **the purpose of center** and that it can be summarized with a single number.	Understands that the center of a set of data can be summarized with a single number.
Operations with Multi-Digit Numbers 6.NS.2 6.NS.3-1 6.NS.3-2 6.NS.3-3 6.NS.3-4 6.Int.1	Solves **two**-step word problems and other problems by dividing multi-digit numbers and adding, subtracting, multiplying and dividing multi-digit decimals **and assesses reasonableness of the result using different methods.**	Solves one-step **word** problems and other problems with some level of accuracy by dividing multi-digit numbers and adding, subtracting, multiplying and dividing multi-digit decimals.	Solves one-step problems by dividing multi-digit numbers and adding, subtracting, multiplying and dividing multi-digit decimals.	Solves one-step problems with **limited accuracy** by dividing multi-digit numbers and adding, subtracting, multiplying and dividing multi-digit decimals.

	Grade 6: Sub-Claim C In connection with content, the student expresses grade/course-level appropriate mathematical reasoning by constructing viable arguments, critiquing the reasoning of others and/or attending to precision when making mathematical statements.			
	Level 5: Exceeded Expectations	**Level 4: Met Expectations**	**Level 3: Approached Expectations**	**Level 2: Partially Met Expectations**
Properties of Operations 6.C.1.1 6.C.2	In connection with the content knowledge, skills, and abilities described in Sub-claims A and B, the student clearly constructs and communicates a complete response based on the properties of operations and the relationship between addition and subtraction or between multiplication and division, including: • a logical approach based on a conjecture and/or stated assumptions • a logical and complete progression of steps • precision of calculation • correct use of grade-level vocabulary, symbols and labels • complete justification of a conclusion • **generalization of an argument or conclusion** • evaluating, interpreting, and critiquing the validity and **efficiency** of other's responses, approaches and reasoning, and **providing counter-examples where applicable**.	In connection with the content knowledge, skills, and abilities described in Sub-claims A and B, the student **clearly** constructs and communicates a complete response based on the properties of operations and the relationship between addition and subtraction or between multiplication and division, including: • a logical approach based on a conjecture and/or stated assumptions • a logical and **complete** progression of steps • **precision** of calculation • **correct** use of grade-level vocabulary, symbols and labels • **complete** justification of a conclusion • evaluating, **interpreting and critiquing** the validity of other's responses, approaches and reasoning.	In connection with the content knowledge, skills, and abilities described in Sub-claims A and B, the student constructs and communicates a **complete** response based on the properties of operations and the relationship between addition and subtraction or between multiplication and division, including: • **a logical** approach based on a conjecture and/or stated assumptions • **a logical**, but incomplete, progression of steps • **minor** calculation errors • **some** use of grade-level vocabulary, symbols and labels • partial justification of a conclusion • **evaluating the validity of other's approaches and conclusions.**	In connection with the content knowledge, skills, and abilities described in Sub-claims A and B, the student constructs and communicates an incomplete response based on the properties of operations and the relationship between addition and subtraction or between multiplication and division, which may include: • a faulty approach based on a conjecture and/or stated assumptions • an incomplete or illogical progression of steps • major calculation errors • limited use of grade-level vocabulary, symbols and labels • partial justification of a conclusion
Concrete Referents and Diagrams 6.C.3 6.C.4	In connection with the content knowledge, skills, and abilities described in Sub-claims A and B, the student clearly constructs and communicates a complete	In connection with the content knowledge, skills, and abilities described in Sub-claims A and B, the student **clearly** constructs and communicates a complete	In connection with the content knowledge, skills, and abilities described in Sub-claims A and B, the student constructs and communicates a **complete**	In connection with the content knowledge, skills, and abilities described in Sub-claims A and B, the student constructs and communicates an incomplete

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6.C.5	response based on concrete referents provided in the prompt or constructed by the student such as: diagrams that are connected to a written (symbolic) method, number line diagrams or coordinate plane diagrams, including: • a logical approach based on a conjecture and/or stated assumptions • a logical and complete progression of steps • precision of calculation • correct use of grade-level vocabulary, symbols and labels • complete justification of a conclusion • **generalization of an argument or conclusion** • evaluating, interpreting and critiquing the validity and efficiency of other's responses, approaches and reasoning, and **provides a counter-example where applicable.**	response based on concrete referents provided in the prompt or constructed by the student such as: diagrams that are connected to a written (symbolic) method, number line diagrams or coordinate plane diagrams, including: • a logical approach based on a conjecture and/or stated assumptions • a logical and **complete** progression of steps • **precision** of calculation • **correct** use of grade-level vocabulary, symbols and labels • **complete justification of a conclusion** • **evaluating**, interpreting and critiquing **the validity of other's** responses, **approaches and** reasoning	response based on concrete referents provided in the prompt or **in simple cases, constructed by the student** such as: diagrams **that are connected to a written (symbolic) method**, number line diagrams or coordinate plane diagrams, including: • a **logical** approach based on a conjecture and/or stated assumptions • a **logical**, but incomplete, progression of steps • **minor** calculation errors • **some use** of grade-level vocabulary, symbols and labels • partial justification of a conclusion • **evaluating the validity of other's approaches and conclusions.**	response based on concrete referents provided in the prompt such as: diagrams, number line diagrams or coordinate plane diagrams, which may include: • a faulty approach based on a conjecture and/or stated or faulty assumptions • an incomplete or illogical progression of steps • major calculation errors • limited use of grade-level vocabulary, symbols and labels • partial justification of a conclusion
Distinguish Correct Explanation/ Reasoning from that which is Flawed	In connection with the content knowledge, skills, and abilities described in Sub-claims A and B, the student clearly constructs and communicates a complete response to a given equation, multi-step problem, proposition or	In connection with the content knowledge, skills, and abilities described in Sub-claims A and B, the student clearly constructs and communicates a complete response to a given equation, multi-step problem, proposition or	In connection with the content knowledge, skills, and abilities described in Sub-claims A and B, the student constructs and communicates a **complete** response to a given equation, multi-step problem, proposition or	In connection with the content knowledge, skills, and abilities described in Sub-claims A and B, the student constructs and communicates an incomplete response to a given equation, multi-step problem, proposition or

	Grade 6: Sub-Claim C In connection with content, the student expresses grade/course-level appropriate mathematical reasoning by constructing viable arguments, critiquing the reasoning of others and/or attending to precision when making mathematical statements.			
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6.C.6 6.C.7 6.C.8.1 6.C.8.2 6.C.9	conjecture, including: • a logical approach based on a conjecture and/or stated assumptions • a logical and complete progression of steps • precision of calculation • correct use of grade-level vocabulary, symbols and labels • complete justification of a conclusion • **generalization of an argument or conclusion** • evaluating, interpreting and critiquing the validity and efficiency of other's responses, approaches and reasoning, and **providing a counter-example where applicable.** • identifying and describing errors in solutions and presents correct solutions. • **distinguishing correct explanation/reasoning from that which is flawed. If there is a flaw, presents correct reasoning.**	conjecture, including: • a logical approach based on a conjecture and/or stated assumptions • a logical and **complete** progression of steps • **precision** of calculation • **correct** use of grade-level vocabulary, symbols and labels • **complete** justification of a conclusion • evaluating**, interpreting and critiquing** the validity of other's responses, approaches and **reasoning.** • identifying and describing error in solutions and **presents correct solutions.**	conjecture, including: • a **logical** approach based on a conjecture and/or stated assumptions • **a logical, but incomplete, progression of steps** • minor calculation errors • **some** use of grade-level vocabulary, symbols and labels • partial justification of a conclusion • **evaluating the validity of other's approaches and conclusion.** • **identifying and describing errors in solutions.**	conjecture, including: • an approach based on a conjecture and/or stated or faulty assumptions • an incomplete or illogical progression of steps • major calculation errors • limited use of grade-level vocabulary, symbols and labels • partial justification of a conclusion

	Grade 6: Sub-Claim D In connection with content, the student solves real-world problems with a degree of difficulty appropriate to the grade/course by applying knowledge and skills articulated in the standards for the current grade/course (or for more complex problems, knowledge and skills articulated in the standards for previous grades/courses), engaging particularly in the Modeling practice, and where helpful making sense of problems and persevering to solve them, reasoning abstractly, and quantitatively, using appropriate tools strategically, looking for the making use of structure and/or looking for and expressing regularity in repeated reasoning.			
	Level 5: Exceeded Expectations	**Level 4: Met Expectations**	**Level 3: Approached Expectations**	**Level 2: Partially Met Expectations**
Modeling 6.D.1 6.D.2 6.D.3	**I**n connection with the content knowledge, skills, and abilities described in Sub-claims A and B, the student **d**evises a plan to apply mathematics in solving problems arising in everyday life, society and the workplace by: • using stated assumptions and making assumptions and approximations to simplify a real-world situation • mapping relationships between important quantities by selecting appropriate tools to create models • analyzing relationships mathematically between important quantities to draw conclusions • writing a complete, clear and correct algebraic expression or equation to describe a situation • applying proportional reasoning • writing/using functions to describe how one quantity of interest depends on another • using reasonable estimates of known quantities in a chain of reasoning that yields an estimate of an unknown quantity	In connection with the content knowledge, skills, and abilities described in Sub-claims A and B, the student devises a plan to apply mathematics in solving problems arising in everyday life, society and the workplace by: • using stated assumptions and **making assumptions** and **approximations** to simplify a real-world situation • **mapping relationships** between important quantities by **selecting appropriate** tools to create models • analyzing relationships mathematically between important quantities to draw conclusions • writing **a complete, clear, and correct** algebraic expression or equation to describe a situation • applying proportional reasoning • writing/using functions to describe how one quantity of interest depends on another • using reasonable estimates of known quantities in a chain of reasoning that yields an estimate of an unknown quantity	In connection with the content knowledge, skills, and abilities described in Sub-claims A and B, the student devises a plan to apply mathematics in solving problems arising in everyday life, society and the workplace by: • using stated assumptions and approximations to simplify a real-world situation • **illustrating relationships** between important quantities by using provided tools to create models • analyzing relationships mathematically **between important quantities** to draw conclusions • writing an incomplete algebraic expression or equation to describe a situation • applying proportional reasoning • **writing/**using functions to describe how one quantity of interest depends on another • using **reasonable** estimates of known quantities in a chain of reasoning that yields an estimate of an unknown quantity • **reflecting on whether the results**	In connection with the content knowledge, skills, and abilities described in Sub-claims A and B, the student devises a plan to apply mathematics in solving problems arising in everyday life, society and the workplace by: ● using stated assumptions and approximations to simplify a real-world situation ● identifying important quantities by using provided tools to create models ● analyzing relationships mathematically to draw conclusions ● writing an incomplete algebraic expression or equation to describe a situation ● applying proportional reasoning ● using functions to describe how one quantity of interest depends on another ● using unreasonable estimates of known quantities in a chain of reasoning that yields an estimate of an unknown quantity

	Grade 6: Sub-Claim D In connection with content, the student solves real-world problems with a degree of difficulty appropriate to the grade/course by applying knowledge and skills articulated in the standards for the current grade/course (or for more complex problems, knowledge and skills articulated in the standards for previous grades/courses), engaging particularly in the Modeling practice, and where helpful making sense of problems and persevering to solve them, reasoning abstractly, and quantitatively, using appropriate tools strategically, looking for the making use of structure and/or looking for and expressing regularity in repeated reasoning.			
	Level 5: Exceeded Expectations	**Level 4: Met Expectations**	**Level 3: Approached Expectations**	**Level 2: Partially Met Expectations**
	• reflecting on whether the results make sense • improving the model if it has not served its purpose • interpreting mathematical results in the context of the situation • **analyzing and/or creating limitations, relationships and interpreting goals within the model** • **analyzing, justifying and defending models which lead to a conclusion**	• reflecting on whether the results make sense • **improving** the model if it has not served its purpose • interpreting mathematical results in **the context of the situation**	**make sense** • **modifying the model if it has not served its purpose** • **interpreting mathematical results in a simplified context**	