CMAS Grade 3 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 3 Math : Sub-Claim A The student solves problems involving the Major 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**
Products and Quotients 3.OA.1 3.OA .2 3.OA .4 3.OA .6 3.OA.7-1 3.OA.7-2	**Understands** and interprets products and quotients of whole numbers. Determines the unknown whole number in a multiplication or division problem by relating multiplication and division. **Both factors are greater than 5 and less than or equal 10.** **Represents a multiplication or division situation as an equation.** Accurately multiplies and divides within 100, using strategies relating multiplication and division or properties of operations.	Interprets products and quotients of whole numbers. Determines the unknown whole number in a multiplication or division problem by relating multiplication and division. **One factor** is **greater than or equal** to 5. **Accurately** multiplies and divides within 100, using strategies relating multiplication and division or properties of operations.	**Interprets** products and quotients of whole numbers. Determines the unknown whole number in a multiplication or division problem by relating multiplication and division, with both factors less than or equal to 5, or with one factor of 10. Multiplies and divides within 100, **using strategies relating multiplication and division or properties of operations.**	Determines products and quotients of whole numbers within 100. Determines the unknown whole number in a multiplication or division problem by relating multiplication and division, with both factors less than or equal to 5, or with one factor of 10.
Multiplication and Division 3.OA.3-1 3.OA.3-2 3.OA.3-3 3.OA.3-4	Uses multiplication and division within 100 to solve word problems involving equal groups, arrays, **area, and measurement quantities other than area. Both factors are greater than 5 and less than or equal to 10.** **Identifies multiple contexts given**	**Uses multiplication and division within 100 to solve word problems** involving equal groups and arrays. **One factor** is **greater than or equal** to 5.	Given a visual aid, uses multiplication and division within 100 to solve word problems involving equal groups **and arrays**, with both factors less than or equal to 5, or with one factor of 10.	Given a visual aid, uses multiplication and division within 100 to solve word problems involving equal groups. Both factors are less than or equal to 5, with both factors less than or equal to 5, or with one factor of 10.

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	a numerical expression involving multiplication and division.			
Two-Step Problems 3.OA.8 3.Int.1 3.Int.2	Solves two-step **unscaffolded** word problems using the four operations, **including rounding where appropriate**, in which the unknown is in a variety of positions. **Both values** for each operation performed is substantial (towards the upper limits as defined by the standard assessed).	Solves two-step scaffolded word problems using the four operations **in which the unknown is in a variety of positions.** One of the values for each operation performed is substantial (towards the upper limits as defined by the standard assessed).	Solves two-step scaffolded word problems using the four operations and in which the sum, difference, product or quotient is always the unknown. **One of the values for each operation performed is substantial (towards the upper limits as defined by the standard assessed).**	Solves two-step scaffolded word problems using the four operations and in which the sum, difference, product or quotient is always the unknown.
Fraction Equivalence 3.NF.3a-1 3.NF.3a-2 3.NF.3b-1 3.NF-3c 3.NF-3d 3.NF.A.Int.1	Understands, recognizes and generates equivalent fractions with denominators of 2, 3, 4, 6 and 8. Expresses whole numbers as fractions and recognize fractions that are equivalent to whole numbers. Compares two fractions that have the same numerator or same denominator using symbols to justify conclusions. **Plots the location of equivalent fractions on a number line.** The student must recognize that two fractions must refer to the same whole in order to compare. **Given a whole number and two fractions in a real-world situation, plots all three numbers on a**	**Understands, recognizes and generates equivalent fractions using denominators of 2, 4, and 8.** Expresses whole numbers as fractions. Compares two fractions that have the same numerator or same denominator using symbols **and justifies conclusions by using a visual model.** The student must recognize that two fractions must refer to the same whole in order to compare.	Given a visual model, **understands,** recognizes and **generates** equivalent fractions with denominators of 2, 4 and 8. Expresses **whole numbers** as fractions. **Compares two fractions that have the same numerator or same denominator using symbols. The student must recognize that two fractions must refer to the same whole in order to compare.**	Given a visual model recognizes equivalent fractions with denominators of 2, 4 and 8. Expresses the number 1 as a fraction.

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	number line and determines which fraction is closest to the whole number. Justifies the comparison by plotting points on a number line.			
Fractions as Numbers 3.NF.1 3.NF.2 3.NF.A.Int.1	Understands 1/*b* is equal to one whole that is partitioned into *b* equal parts – limiting the denominators to 2, **3**, 4, **6** and 8. Represents 1/*b* on a number line diagram by partitioning the number line between 0-1 into *b* equal parts recognizing that *b* is the total number of parts. Demonstrates the understanding of the quantity *a*/*b* by marking off *a* parts of 1/*b* from 0 on the number line and **states that the endpoint locates the number *a*/*b*.** **Applies the concepts of 1/*b* and *a*/*b* in real-world situations.** **Describes the number line that best fits the context.**	Understands 1/*b* is equal to one whole that is partitioned into *b* equal parts – limiting the denominators to 2, 4 and **8**. Represents 1/*b* on a number line diagram by partitioning the number line between 0-1 into *b* equal parts recognizing that *b* is the total number of parts. **Demonstrates the understanding of the quantity *a*/*b* by marking off *a* parts of 1/*b* from 0 on the number line.**	Understands 1/*b* is equal to one whole that is partitioned into *b* equal parts – limiting the denominators to 2 and 4. **Represents 1/*b* on a number line diagram by partitioning the number line between 0-1 into *b* equal parts recognizing that *b* is the total number of parts.** **Represents fractions in the form *a*/*b* using a visual model.**	Understands 1/*b* is equal to one whole that is partitioned into *b* equal parts – limiting the denominators to 2 and 4. Identifies 1/*b* on a number line diagram when partitioned between 0 and 1 into *b* equal parts.
Time 3.MD.1-1 3.MD.1-2	Tells, writes and measures time to the nearest minute. Solves **two–step** word problems involving addition **and** subtraction	Tells, writes and measures time to the nearest minute. **Solves one-step word problems involving addition or subtraction**	Tells, writes and measures time to the nearest minute. **Solves one-step word problems involving addition or subtraction**	Tells, writes and measures time to the nearest minute.

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	of time intervals in minutes.	**of time intervals in minutes.**	**of time intervals in minutes, with scaffolding, such as a number line diagram.**	
Volumes and Masses 3.MD.2-1 3.MD.2-2 3.MD.2-3 3.Int.5	Using grams, kilograms or liters, measures, estimates and **solves multi-step word problems** involving liquid volumes and masses of objects using any of the four basic operations. **Number values should be towards the higher end of the acceptable values for each operation.** Uses estimated measurements **to compare answers** to one-step word problems. **Evaluates usefulness and accuracy of estimations.**	**Using grams, kilograms or liters, measures and estimates liquid volumes and masses of objects using any of the four basic operations.** **Uses estimated measurements, when indicated, to answer one-step word problems.**	Using grams, kilograms or liters, measures **and estimates** liquid volumes and masses of objects **using concrete objects** (beakers, measuring cups, scales) **to develop estimates.**	Using grams, kilograms or liters, measures liquid volumes and masses of concrete objects (beakers, measuring cups, scales).
Geometric Measurement 3.MD.5 3.MD.6 3.MD.7b-1 3.MD.7d	Recognizes area as an attribute of plane figures. Understands area is measured using square units. **Describes a visual model to show understanding that** area that can be found by covering a plane figure without gaps or overlaps by unit squares and counting them. **Connects counting squares to multiplication when finding area.**	Recognizes area as an attribute of plane figures. With a visual model, understands area is measured using square units. Determines area by covering a plane figure without gaps or overlaps by unit squares and counting them.	Recognizes area as an attribute of plane figures. With a visual model, understands area is measured using square units. **Determines area by covering a plane figure without gaps or overlaps by unit squares and counting them.**	Recognizes area as an attribute of plane figures. With a visual model, understands area is measured using square units. Determines area by counting unit squares.

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	Represents the area of a plane figure as "n" square units.	**Represents the area of a plane figure as "n" square units.**		

	Grade 3 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**
Multi-Digit Arithmetic 3.NBT.2 3.NBT.3	Accurately adds and subtracts within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction. Multiplies one-digit whole numbers by multiples of 10 in the range 10-90 using strategies based on place value	**Accurately** adds and subtracts within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction. Uses repeated addition to multiply one-digit whole numbers by multiples of 10 in the range 10-90 **using strategies based on place value and properties of operations.**	Adds and subtracts within 1000, using strategies and algorithms based on place value, properties of operations with scaffolding, and/or the relationship between addition and subtraction. **Uses repeated addition to multiply one-digit whole numbers by multiples of 10 in the range 10-90 using strategies based on place value and properties of operations.**	Adds and subtracts within 1000, using strategies and algorithms based on place value, properties of operations with scaffolding, and/or the relationship between addition and subtraction.
Scaled Graphs 3.MD.3-1 3.MD.3-3 3.Int.4	Completes a scaled picture graph and a scaled bar graph to represent a data set. Solves one-and two-step "how many more" and "how many less" problems, **requiring a substantial addition, subtraction or multiplication step,** using information presented in scaled bar graphs.	**Completes a scaled picture graph and a scaled bar graph to represent a data set**. Solves one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs.	**Completes a scaled picture graph and a scaled bar graph to represent a data set, with scaffolding, such as using a model as a guide.** Solves one-step "how many more" and "how many less" problems using information presented in scaled bar graphs.	Identifies a correctly scaled picture graph and a correctly scaled bar graph to represent a data set. Solves one-step "how many more" and "how many less" problems using information presented in scaled bar graphs.
Measurement Data	Generates measurement data by measuring lengths to the nearest	Generates measurement data by measuring lengths to the nearest	**Generates measurement data by measuring lengths to the nearest**	Identifies correct measurement from figures with appropriate scale

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3.MD.4	half and **fourth** inch. Shows the data by making a line plot, where the horizontal scale is marked in appropriate units of whole numbers, halves **or quarters**. **Uses the line plot to answer questions or solve problems.**	half inch. Shows the data by making a line plot, where the horizontal scale is marked in appropriate units of whole numbers or halves.	**half inch.** **Shows the data by making a line plot, where the horizontal scale is marked in appropriate units of whole numbers or halves, with scaffolding.**	provided.
Understanding Shapes 3.G.1	Understands the properties of quadrilaterals and the subcategories of quadrilaterals. Recognizes **and sorts** examples of quadrilaterals that have shared attributes and **shows** that the shared attributes can define a larger category. Draws examples and **non-examples** of quadrilaterals with specific attributes.	**Understands the properties** of quadrilaterals and the subcategories of quadrilaterals. Recognizes examples of quadrilaterals that have shared attributes and that the shared attributes can define a larger category. **Draws examples of quadrilaterals with specific attributes.**	Identifies examples of quadrilaterals and the subcategories of quadrilaterals. **Recognizes examples of quadrilaterals that have shared attributes and that the shared attributes can define a larger category.**	Identifies examples of quadrilaterals and the subcategories of quadrilaterals.
Perimeter and Area 3.G.2 3.MD.8 3.Int.3	Solves real-world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and provides examples of rectangles with **the same perimeter and different areas** or with the same area and different perimeters**.**	Solves mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, **finding an unknown side length**, and **provides examples of** rectangles with the same area and different perimeters.	Solves mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, **and identifying rectangles with the same area and different perimeters.**	Solves mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths.

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	A substantial addition, subtraction, or multiplication step with number values towards the higher end of the acceptable values for each operation Partitions shapes into parts with equal areas and expresses the area as a unit fraction of the whole.			

	Grade 3 Math: 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 3.C.1-1 3.C.1-2 3.C.1-3 3.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 written response based on explanations/reasoning using the: • properties of operations • relationship between addition and subtraction • relationship between multiplication and division • identification of arithmetic patterns Response may include: • a logical/defensible approach based on a conjecture and/or stated assumptions, utilizing mathematical connections (when	In connection with the content knowledge, skills, and abilities described in Sub-claims A and B, the student clearly constructs and communicates a complete written response based on explanations/reasoning using the: • properties of operations • relationship between addition and subtraction • relationship between multiplication and division • identification of arithmetic patterns Response may include: • a logical/**defensible** approach based on a conjecture and/or stated assumptions, **utilizing**	In connection with the content knowledge, skills, and abilities described in Sub-claims A and B, the student constructs and communicates a written response based on explanations/reasoning using the: • properties of operations • relationship between addition and subtraction • relationship between multiplication and division • identification of arithmetic patterns Response may include: • a **logical** approach based on a conjecture and/or stated assumptions	In connection with the content knowledge, skills, and abilities described in Sub-claims A and B, the student constructs and communicates an incomplete written response based on explanations/reasoning using the: • properties of operations • relationship between addition and subtraction • relationship between multiplication and division • identification of arithmetic patterns Response may include: • an approach based on a conjecture and/or stated or faulty assumptions • an incomplete or illogical

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	appropriate) • an efficient and logical progression of steps **with appropriate justification** • precision of calculation • correct use of grade-level vocabulary, symbols and labels • justification of a conclusion	**mathematical connections (when appropriate)** • a logical progression of steps • precision of calculation • **correct** use of grade-level vocabulary, symbols and labels • justification of a conclusion	• a **logical**, but incomplete, progression of steps • **minor** calculation errors • limited use of grade-level vocabulary, symbols and labels • partial justification of a conclusion based on own calculations	progression of steps • an intrusive calculation error • limited use of grade-level vocabulary, symbols and labels • partial justification of a conclusion based on own calculations
	• **determination of whether an argument or conclusion is generalizable** • evaluating, interpreting and critiquing the validity of other's responses, reasonings, and approaches, utilizing mathematical connections (when appropriate). **Provides a counter-example where applicable.**	• evaluating**, interpreting and critiquing** the validity of other's responses, **reasonings, and approaches, utilizing mathematical connections (when appropriate)**.	• **evaluating the validity of other's responses, approaches and conclusions.**	
Concrete Referents and Diagrams 3.C.3-1 3.C.3-2 3.C.6-1 3.C.6-2	In connection with the content knowledge, skills, and abilities described in Sub-claims A and B, the student clearly constructs and communicates a well-organized and complete response based on operations using concrete referents such as diagrams--including number lines (whether provided in the prompt or constructed by the student) and connecting the diagrams to a written (symbolic) method, which may include: • a logical approach based on a	In connection with the content knowledge, skills, and abilities described in Sub-claims A and B, the student clearly constructs and communicates a well-**organized and complete** response based on operations using concrete referents such as diagrams--including number lines (**whether provided in the prompt or constructed by the student**) and connecting the diagrams to a written (symbolic) method, which may include: • a logical approach based on a	In connection with the content knowledge, skills, and abilities described in Sub-claims A and B, the student constructs and communicates **a response** based on operations using concrete referents such as diagrams – including number lines (provided in the prompt) – connecting the diagrams to a written (symbolic) method, which may include: • **a logical approach based on a conjecture and/or stated assumptions**	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 operations using concrete referents such as diagrams – including number lines (provided in the prompt) – connecting the diagrams to a written (symbolic) method, which may include: • a conjecture and/or stated or faulty assumptions

	Grade 3 Math: 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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	conjecture and/or stated assumptions, utilizing mathematical connections (when appropriate) • an **efficient** and logical progression of steps **with appropriate justification** • precision of calculation • correct use of grade-level vocabulary, symbols and labels • justification of a conclusion • **determination of whether an argument or conclusion is generalizable** • evaluating, interpreting, and critiquing the validity of other's responses, approaches, and reasoning**, and providing a counter-example where applicable**	conjecture and/or stated assumptions, **utilizing mathematical connections (when appropriate)** • a logical progression of steps • **precision of calculation** • **correct** use of grade-level vocabulary, symbols and labels • justification of a conclusion • evaluating, **interpreting, and critiquing** the validity of other's responses, approaches, and **reasoning.**	• a **logical**, but incomplete, progression of steps • **minor** calculation errors • **some** use of grade-level vocabulary, symbols and labels • partial justification of a conclusion based on own calculations. • **evaluating** the validity of other's responses, **approaches and conclusions**	• an incomplete or illogical progression of steps • an intrusive calculation error • limited use of grade-level vocabulary, symbols and labels • partial justification of a conclusion based on own calculations • accepting the validity of other's responses
Distinguish Correct Explanation/ Reasoning from that which is Flawed 3.C.4-1 3.C.4-2 3.C.4-3 3.C.4-4 3.C.4-5 3.C.4-6	In connection with the content knowledge, skills, and abilities described in Sub-claims A and B, the student clearly constructs and communicates a well-organized and complete response by: • presenting and defending solutions to multi-step problems in the form of valid chains of reasoning, using symbols such as equal signs appropriately • **evaluating** explanation/reasoning; if there is	In connection with the content knowledge, skills, and abilities described in Sub-claims A and B, the student **clearly** constructs and communicates **a well-organized** and complete response by: • presenting and **defending** solutions to multi-step problems in the form of valid chains of reasoning, using symbols such as equal signs appropriately • distinguishing correct explanation/reasoning from that	In connection with the content knowledge, skills, and abilities described in Sub-claims A and B, the student constructs and communicates a **complete** response by**:** • presenting solutions to **multi-step** problems in the form of valid chains of reasoning**,** using symbols such as equal signs appropriately • distinguishing correct explanation/reasoning from that	In connection with the content knowledge, skills, and abilities described in Sub-claims A and B, the student constructs and communicates an incomplete response by: • presenting solutions to scaffolded two-step problems in the form of valid chains of reasoning, sometimes using symbols such as equal signs appropriately • distinguishing correct

	Grade 3 Math: 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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3.C.5-1 3.C.5-2 3.C.4-7	a flaw in the argument • presenting **and defending** corrected reasoning Response may include: • a logical approach based on a conjecture and/or stated assumptions, utilizing mathematical connections (when appropriate) • **an efficient** and logical progression of steps **with appropriate justification** • **precision of calculation**	which is flawed • identifying and describing the flaw in reasoning or describing errors in solutions to multi-step problems • presenting corrected reasoning Response may include: • a logical approach based on a conjecture and/or stated assumptions, **utilizing mathematical connections (when appropriate)** • **a logical progression of steps** • **precision of calculation**	which is flawed • identifying and **describing the flaw in reasoning or describing errors in solutions to multi-step problems** • **presenting corrected reasoning** Response may include: • **a logical approach based on a conjecture and/or stated assumptions** • **a logical**, but incomplete, progression of steps • **minor** calculation errors	explanation/reasoning from that which is flawed • identifying an error in reasoning Response may include: • a conjecture based on faulty assumptions • an incomplete or illogical progression of steps • an intrusive calculation error
	• correct use of grade-level vocabulary, symbols and labels • justification of a conclusion • **evaluation of whether an argument or conclusion is generalizable** • evaluating, interpreting, and critiquing the validity of other's responses, approaches and reasoning, and **providing a counter-example where applicable.**	• **correct** use of grade-level vocabulary, symbols and labels • **justification of a conclusion** • evaluating**, interpreting and critiquing** the validity of other's responses, approaches and **reasoning**.	• **some** use of grade-level vocabulary, symbols and labels • partial justification of a conclusion based on own calculations • **evaluating** the validity of other's responses, **approaches and conclusions.**	• limited use of grade-level vocabulary, symbols and labels • partial justification of a conclusion based on own calculations • accepting the validity of other's responses

	Grade 3 Math: 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.			
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Modeling 3.D.1 3.D.2	In connection with the content knowledge, skills, and abilities described in Sub-claims A and B, the student devises a plan and applies mathematics to solve multi-step, real-world contextual word problems by: • using stated assumptions or making assumptions and using approximations to simplify a real-world situation • **analyzing and/or creating constraints, relationships and goals** • mapping relationships between important quantities by selecting appropriate tools to create models • analyzing relationships mathematically between important quantities to draw conclusions • **justifying and defending models which lead to a conclusion** • interpreting mathematical results in the context of the situation • reflecting on whether the results make sense • improving the model if it has not served its purpose	In connection with the content knowledge, skills, and abilities described in Sub-claims A and B, the student devises a plan and applies mathematics to solve multi-step, real-world contextual word problems by: • using stated assumptions or **making assumptions and using** 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 • interpreting mathematical results in the context **of the situation** • reflecting on whether the results make sense • modifying **and/or improving** the model if it has not served its purpose • writing an arithmetic expression or equation to describe a situation	In connection with the content knowledge, skills, and abilities described in Sub-claims A and B, the student devises a plan and applies mathematics to solve multi-step, real-world contextual word problems 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 • **interpreting mathematical results in a simplified context** • **reflecting on whether the results make sense** • **modifying the model if it has not served its purpose** • writing an arithmetic expression or equation to describe a situation	In connection with the content knowledge, skills, and abilities described in Sub-claims A and B, the student devises a plan and applies mathematics to solve multi-step, real-world contextual word problems 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 arithmetic expression or equation to describe a situation

	Grade 3 Math: 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**
	• writing a concise arithmetic expression or equation to describe a situation			