

CMAS Geometry 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.

	Geometry: 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
Congruence Transformations G-CO.6 G-CO.C	Determines and uses appropriate geometric theorems and properties of rigid motions, lines, angles, triangles and parallelograms to solve problems and prove statements about angle measurement, triangles, distance, line properties and congruence.	Uses given geometric theorems and properties of rigid motions, lines, angles, triangles and parallelograms to solve routine problems and prove statements about angle measurement, triangles, distance, line properties and congruence.	Uses given geometric theorems and properties of rigid motions, lines, angles, triangles and parallelograms to solve routine problems and reason about angle measurement, triangles, distance, line properties and congruence.	Uses given geometric theorems and properties of rigid motions, lines, angles, triangles and parallelograms to solve routine problems.
Similarity G-SRT.1a G-SRT.1b G-SRT.2 G-SRT.5	Uses transformations and congruence and similarity criteria for triangles to prove relationships among geometric figures and to solve problems.	Uses transformations to determine relationships among simple geometric figures and to solve problems.	Identifies transformation relationships in simple geometric figures.	Identifies transformation relationships in simple geometric figures in cases where an image is provided.
Similarity in Trigonometry G-SRT.6 G-SRT.7-2 G-SRT.8	Uses trigonometric ratios, the Pythagorean Theorem and the relationship between sine and cosine to solve right triangles in applied problems. Uses similarity transformations with right triangles to define trigonometric ratios for acute angles.	Uses trigonometric ratios, the Pythagorean Theorem and the relationship between sine and cosine to solve right triangles in applied problems.	Uses trigonometric ratios and the Pythagorean Theorem to determine the unknown side lengths and angle measurements of a right triangle.	Uses trigonometric ratios and the Pythagorean Theorem to determine the unknown side lengths of a right triangle.
Modeling and Applying	Uses geometric relationships in the	Uses geometric relationships in the	Uses provided geometric	Uses provided geometric relationships in the coordinate

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G-SRT.7-2 G-SRT.8 G-GPE.6 G-Int.1	coordinate plane to solve problems involving area, perimeter and ratios of lengths. Applies geometric concepts and trigonometric ratios to describe, model and solve applied problems (including design problems) related to the Pythagorean Theorem, density , geometric shapes, their measures and properties.	coordinate plane to solve problems involving area, perimeter and ratios of lengths . Applies geometric concepts to describe, model and solve applied problems related to the Pythagorean Theorem, geometric shapes, their measures and properties.	relationships in the coordinate plane to solve problems involving area and perimeter. Applies geometric concepts to describe, model and solve applied problems related to the Pythagorean Theorem , geometric shapes, their measures and properties.	plane to solve problems involving area and perimeter. Applies geometric concepts to describe, model and solve applied problems related to geometric shapes, their measures, and properties.

	Geometry: 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
Transformations G-CO.1 G-CO.3 G-CO.5	Given a figure and a sequence of transformations, draws the transformed figure. Uses precise geometric terminology to specify a sequence of transformations that will carry a figure onto itself or another.	Given a figure and a transformation, draws the transformed figure. Specifies a sequence of transformations that will carry a figure onto another.	Given a figure and a transformation, draws the transformed figure.	Given a figure and a transformation, identifies a transformed figure.
Geometric Constructions G-CO.D	Understands geometric constructions: copying a segment, copying an angle, bisecting an angle, bisecting a segment, including the perpendicular bisector of a line segment.	Understands geometric constructions: copying a segment, copying an angle, bisecting an angle, bisecting a segment, including the perpendicular bisector of a line segment.	Understands basic geometric constructions: copying a segment, copying an angle, bisecting an angle, bisecting a segment, including the perpendicular bisector of a line segment.	Understands basic geometric constructions: copying a segment, and copying an angle.

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	Given a line and a point not on the line, uses a variety of tools and methods to construct perpendicular and parallel lines. Uses a variety of tools and methods to construct equilateral triangles, squares, and hexagons inscribed in circles.	Given a line and a point not on the line, constructs perpendicular and parallel lines.		
Applying Geometric Properties and Theorems G-C.2 G-C.B G-GPE.1-1 G-GPE.1-2	Applies properties and theorems of angles, segments and arcs in circles to solve problems and model relationships. Completes the square to find the center and radius of a circle given by an equation.	Applies properties and theorems of angles, segments and arcs in circles to solve problems. Completes the square to find the center and radius of a circle given by an equation.	Applies properties and theorems of angles, segments and arcs in circles to solve problems.	Applies properties and theorems of angles and segments to solve problems.
Geometric Formulas G-GMD.1 G-GMD.3 G-GMD.4	Uses volume formulas to solve mathematical and contextual problems that involve cylinders, pyramids, cones and spheres. Uses dissection arguments, Cavalieri's principle and informal limit arguments to support the formula for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. Identifies the shapes of two-dimensional cross-sections	Using formulas, determines the volume of cylinders, pyramids, cones and spheres. Gives an informal argument for the formula for the circumference of a circle and area of a circle, including dissection arguments. Identifies the shapes of two-dimensional cross-sections of three-dimensional objects.	Using formulas, determines the volume of cylinders, pyramids, cones and spheres. Identifies the shapes of two-dimensional cross-sections of three-dimensional objects,.	Using formulas, determines the volume of cylinders, pyramids, cones and spheres. Identifies the shapes of two-dimensional cross-sections of three-dimensional objects, when cross sections are parallel or perpendicular to a base/face.

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	of three-dimensional objects and identifies three-dimensional objects generated by rotations of two-dimensional objects.			

	Geometry: Sub-Claim C In connection with content, the student expresses 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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Reasoning HS.C.13.1 HS.C.13.2 HS.C.13.3 HS.C.14.1 HS.C.14.2 HS.C.14.3 HS.C.14.5 HS.C.14.6 HS.C.15.14 HS.C.18.2	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: <ul style="list-style-type: none"> a chain of reasoning to justify or refute algebraic and/or geometric propositions or conjectures geometric reasoning in a coordinate setting, OR a response to a multi-step problem, by: <ul style="list-style-type: none"> using a logical approach based on a conjecture and/or stated assumptions, utilizing mathematical connections (when appropriate) providing an efficient and logical 	In connection with the content knowledge, skills, and abilities described in Sub-claims A and B, the student clearly constructs and communicates a response based on: <ul style="list-style-type: none"> a chain of reasoning to justify or refute algebraic and/or geometric propositions or conjectures geometric reasoning in a coordinate setting, OR a response to a multi-step problem, by: <ul style="list-style-type: none"> using a logical approach based on a conjecture and/or stated assumptions, utilizing mathematical connections (when appropriate) providing a logical progression of 	In connection with the content knowledge, skills, and abilities described in Sub-claims A and B, the student constructs and communicates a partial response based on: <ul style="list-style-type: none"> a chain of reasoning to justify or refute algebraic and/or geometric propositions or conjectures geometric reasoning in a coordinate setting, OR a response to a multi-step problem, by: <ul style="list-style-type: none"> using a logical approach based on a conjecture and/or stated assumptions providing a logical, but incomplete, progression of steps or chain of reasoning 	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: <ul style="list-style-type: none"> a chain of reasoning to justify or refute algebraic and/or geometric propositions or conjectures geometric reasoning in a coordinate setting, OR a response to a multi-step problem, by : <ul style="list-style-type: none"> using an approach based on a conjecture and/or stated or faulty assumptions providing an incomplete or illogical chain of reasoning, or progression of steps

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	progression of steps or chain of reasoning with appropriate justification • performing precise calculation • using correct grade- level vocabulary, symbols and labels • providing a justification of a conclusion	steps or chain of reasoning with appropriate justification • performing precise calculations • using correct grade-level vocabulary, symbols and labels • providing a justification of a conclusion	• performing minor calculation errors • using some grade-level vocabulary, symbols and labels • providing a partial justification of a conclusion based on own calculations	• making an intrusive calculation error • using limited grade-level vocabulary, symbols and labels • providing a partial justification of a conclusion based on own calculations
	• determining whether an argument or conclusion is generalizable • evaluating, interpreting and critiquing the validity of others' responses, approaches and reasoning – utilizing mathematical connections (when appropriate) – and providing a counter example where applicable.	• evaluating, interpreting and critiquing the validity of others' responses, approaches and reasoning – utilizing mathematical connections (when appropriate).	• evaluating the validity of others' approaches and conclusions	

	Geometry: 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 HS.D.1-2 HS.D.2-1	In connection with the content knowledge, skills, and abilities described in Sub-claims A and B,	In connection with the content knowledge, skills, and abilities described in Sub-claims A and B,	In connection with the content knowledge, skills, and abilities described in Sub-claims A and B,	In connection with the content knowledge, skills, and abilities described in Sub-claims A and B,

	Geometry: 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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HS.D.2-2 HS.D.2-11 HS.D.3-2a HS.D.3-4a	devises and enacts a plan to apply mathematics in solving problems arising in everyday life, society and the workplace by: <ul style="list-style-type: none"> • using stated assumptions and making assumptions and approximations to simplify a real-world situation (includes micro-models) • mapping relationships between important quantities • selecting appropriate tools to create models • analyzing relationships mathematically between important quantities to draw conclusion • analyzing and/or creating constraints, relationships and goals • interpreting mathematical results in the context of the situation 	devises and enacts a plan to apply mathematics in solving problems arising in everyday life, society and the workplace by: <ul style="list-style-type: none"> • using stated assumptions and making assumptions and approximations to simplify a real-world situation (includes micro-models) • mapping relationships between important quantities • 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 • improving the model if it has not served its purpose 	devises and enacts a plan to apply mathematics in solving problems arising in everyday life, society and the workplace by: <ul style="list-style-type: none"> • using stated assumptions and approximations to simplify a real-world situation • illustrating relationships between important quantities • 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 	devises a plan to apply mathematics in solving problems arising in everyday life, society and the workplace by: <ul style="list-style-type: none"> • using stated assumptions and approximations to simplify a real-world situation • identifying important quantities • using provided tools to create models • analyzing relationships mathematically to draw conclusions • writing an algebraic expression or equation to describe a situation • applying proportional reasoning and percentages • applying common geometric principles and theorems

	Geometry: 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
	<ul style="list-style-type: none"> • reflecting on whether the results make sense • improving the model if it has not served its purpose • writing a complete, clear and correct algebraic expression or equation to describe a situation • applying proportional reasoning and percentages justifying and defending models which lead to a conclusion • applying geometric principles and theorems • writing and using functions in any form 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 	<ul style="list-style-type: none"> • writing a complete, clear and correct algebraic expression or equation to describe a situation • applying proportional reasoning and percentages • applying geometric principles and theorems • writing and using functions in any form 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 	<ul style="list-style-type: none"> • writing an algebraic expression or equation to describe a situation • applying proportional reasoning and percentages • applying geometric principles and theorems • writing and 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 	<ul style="list-style-type: none"> • using functions to describe how one quantity of interest depends on another • using estimates of known quantities in a chain of reasoning that yields an estimate of an unknown quantity