Grade 8 Mathematics Item Specifications

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Grade 8 Mathematics

Introduction

In 2014 Missouri legislators passed House Bill 1490, mandating the development of the Missouri Learning Expectations. In April of 2016, these Missouri Learning Expectations were adopted by the State Board of Education. Groups of Missouri educators from across the state collaborated to create the documents necessary to support the implementation of these expectations.

One of the documents developed is the item specification document, which includes all Missouri grade level/course expectations arranged by domains/strands. It defines what could be measured on a variety of assessments. The document serves as the foundation of the assessment development process.

Although teachers may use this document to provide clarity to the expectations, these specifications are intended for summative, benchmark, and large-scale assessment purposes.

Components of the item specifications include:

Expectation Unwrapped breaks down a list of clearly delineated content and skills the students are expected to know and be able to do upon mastery of the Expectation.

Depth of Knowledge (DOK) Ceiling indicates the highest level of cognitive complexity that would typically be assessed on a large scale assessment. The DOK ceiling is not intended to limit the complexity one might reach in classroom instruction.

Item Format indicates the types of items used in large scale assessment. For each expectation, the item format specifies the type best suited for that particular expectation.

Text Types suggests a broad list of text types for both literary and informational expectations. This list is not intended to be all inclusive: other text types may be used in the classroom setting. The expectations were written in grade level bands; for this reason, the progression of the expectations relies upon increasing levels of quantitative and qualitative text

complexities.

Content Limits/Assessment Boundaries are parameters that item writers should consider when developing a large scale assessment. For example, some expectations should not be assessed on a large scale assessment but are better suited for local assessment.

Sample stems are examples that address the specific elements of each expectation and address varying DOK levels. The sample stems provided in this document are in no way intended to limit the depth and breadth of possible item stems. The expectation should be assessed in a variety of ways.

Grade 8 Mathematics

Mathematics		8.NS.A.1.a
NS	**Number Sense and Operations**	
A	**Know that there are numbers that are not rational, and approximate them by rational numbers.**	
1	Explore the real number system.	
a	Know the differences between rational and irrational numbers.	

Expectation Unwrapped

The student will know that all rational numbers can be written as a fraction.

The student will know that all irrational numbers can be written as non-terminating, non-repeating decimals.

DOK Ceiling
3

Item Format
Selected Response
Constructed Response
Technology Enhanced

Sample Stems

State Assessment Content Limits/Boundaries Classroom Work Should Include Extension
Limit square roots to less than or equal to six hundred twenty-five.
Exclude all fractions with a radical in the numerator or denominator

Calculator Designation
NO – a calculator will not be available for items

Grade 8 Mathematics

<table>
<tr><th colspan="2">Mathematics</th><th>8.NS.A.1.b</th></tr>
<tr><td>NS</td><td colspan="2">Number Sense and Operations</td></tr>
<tr><td>A</td><td colspan="2">Know that there are numbers that are not rational, and approximate them by rational numbers.</td></tr>
<tr><td>1</td><td colspan="2">Explore the real number system.</td></tr>
<tr><td>b</td><td colspan="2">Understand that all rational numbers have a decimal expansion that terminates or repeats.</td></tr>
<tr><td colspan="2"><u>Expectation Unwrapped</u>

The student will understand that all rational numbers have a decimal expansion that either terminates or repeats.</td><td><u>DOK Ceiling</u>
3

<u>Item Format</u>
Selected Response
Constructed Response
Technology Enhanced

<u>Sample Stems</u></td></tr>
<tr><td colspan="2"><u>State Assessment Content Limits/Boundaries Classroom Work Should Include Extension</u></td><td><u>Calculator Designation</u>
NO – a calculator will not be available for items</td></tr>
</table>

Grade 8 Mathematics

<table>
<tr><th colspan="2">Mathematics</th><th>8.NS.A.1.c</th></tr>
<tr><td>NS</td><td colspan="2">Number Sense and Operations</td></tr>
<tr><td>A</td><td colspan="2">Know that there are numbers that are not rational, and approximate them by rational numbers.</td></tr>
<tr><td>1</td><td colspan="2">Explore the real number system.</td></tr>
<tr><td>c</td><td colspan="2">Convert decimals which repeat into fractions and fractions into repeating decimals.</td></tr>
<tr><td colspan="2"><u>Expectation Unwrapped</u>

The student will convert repeating decimals into fractions.

The student will convert fractions into repeating decimals.</td><td><u>DOK Ceiling</u>
3

<u>Item Format</u>
Selected Response
Constructed Response
Technology Enhanced

<u>Sample Stems</u></td></tr>
<tr><td colspan="2"><u>State Assessment Content Limits/Boundaries Classroom Work Should Include Extension</u>
Limit for fraction to decimal: Include non-benchmark fractions to the thousandths place. (e.g., $\frac{7}{111} = 0.\overline{063}$)
Limited to conversions from decimals to fractions to the thousandths place. e.g., $0.\overline{123} = \frac{123}{999}$</td><td><u>Calculator Designation</u>
NO – a calculator will not be available for items</td></tr>
</table>

Grade 8 Mathematics

<table>
<tr><th colspan="2">Mathematics</th><th>8.NS.A.1.d</th></tr>
<tr><td>NS
A
1
d</td><td colspan="2">Number Sense and Operations
Know that there are numbers that are not rational, and approximate them by rational numbers.
Explore the real number system.
Generate equivalent representations of rational numbers.</td></tr>
<tr><td colspan="2"><u>Expectation Unwrapped</u>

The student will generate equivalent representations of rational numbers (fractions, decimals and percentages).</td><td><u>DOK Ceiling</u>
3

<u>Item Format</u>
Selected Response
Constructed Response
Technology Enhanced

<u>Sample Stems</u></td></tr>
<tr><td colspan="2"><u>State Assessment Content Limits/Boundaries Classroom Work Should Include Extension</u>
Include fractions beyond the benchmark fractions.</td><td><u>Calculator Designation</u>
NO – a calculator will not be available for items</td></tr>
</table>

Grade 8 Mathematics

Mathematics		8.NS.A.2
NS A 2	**Number Sense and Operations** **Know that there are numbers that are not rational, and approximate them by rational numbers.** Estimate the value and compare the size of irrational numbers and approximate their locations on a number line.	

Expectation Unwrapped

The student will estimate the decimal representation of an irrational number (e.g., $\pi, \sqrt{2}, \sqrt{3}, etc.$).

The student will compare rational and irrational numbers (e.g., $\pi, \sqrt{2}, \sqrt{3}, etc.$) and approximate their locations on a number line.

DOK Ceiling
3

Item Format
Selected Response
Constructed Response
Technology Enhanced

Sample Stems

State Assessment Content Limits/Boundaries Classroom Work Should Include Extension

Limit estimation of irrational numbers to less than the square root of one hundred.
Exclude all fractions with a radical in the numerator or denominator.
Exclude simplified radicals with a coefficient (e.g., $2\sqrt{2}$)

Calculator Designation
NO – a calculator will not be available for items

Grade 8 Mathematics

Mathematics		8.EEI.A.1
EEI **A** **1**	**Expressions, Equations and Inequalities** **Work with radicals and integer exponents.** Know and apply the properties of integer exponents to generate equivalent expressions.	

Expectation Unwrapped

The student will be able to simplify an expression that contains two or more terms with the same base being multiplied by adding the integer exponents.

The student will be able to simplify an expression that contains two or more terms with the same base being divided by subtracting the integer exponents.

The student will be able to simplify an expression that contains a power raised to another power by multiplying the integer exponents.

The student will be able to generate an equivalent expression containing a negative exponent by converting to the multiplicative inverse.

The student will be able to generate an equivalent expression containing a base raised to the power of zero by converting to one.

The student will know any base raised to a power of zero will simplify to be one.

The student will know that the multiplication and division properties will only work when the base is the same.

DOK Ceiling
3

Item Format
Selected Response
Constructed Response
Technology Enhanced

Sample Stems

State Assessment Content Limits/Boundaries Classroom Work Should Include Extension
Only numeric bases (no variables).
Answers should be in exponential form to truly assess if the student can apply the property.
Include expressions with more than one operation.

Calculator Designation
NEUTRAL – a calculator may or may not be available for items

Grade 8 Mathematics

Mathematics		8.EEI.A.2.a
EEI	**Expressions, Equations and Inequalities**	
A	**Work with radicals and integer exponents.**	
2	Investigate concepts of square and cube roots.	
a	Solve equations of the form $x^2 = p$ and $x^3 = p$, where *p* is a positive rational number.	

Expectation Unwrapped

The student will use square root symbols to represent solutions to equations of the form $x^2 = p$.
(e.g., $x^2 = 16;\ x = \pm\sqrt{16};\ x = \pm 4$)

The student will use cube root symbols to represent solutions to equations of the form $x^3 = p$.

DOK Ceiling
3

Item Format
Selected Response
Constructed Response
Technology Enhanced

Sample Stems

State Assessment Content Limits/Boundaries Classroom Work Should Include Extension
Limited to p as positive rational number.
Limit the square roots to less than or equal to six hundred twenty-five and cube roots to one thousand.

Calculator Designation
NO – a calculator will not be available for items

Grade 8 Mathematics

Mathematics		8.EEI.A.2.b
EEI	**Expressions, Equations and Inequalities**	
A	**Work with radicals and integer exponents.**	
2	Investigate concepts of square and cube roots.	
b	Evaluate square roots of perfect squares less than or equal to 625 and cube roots of perfect cubes less than or equal to 1000.	

Expectation Unwrapped

The student will know square roots based on the perfect square.

The student will know the cube root based on the perfect cube.

The students will know the square roots of perfect squares less than or equal to six hundred twenty-five.

The students will know the cube roots of perfect cubes less than or equal to one thousand.

DOK Ceiling
3

Item Format
Selected Response
Constructed Response
Technology Enhanced

Sample Stems

State Assessment Content Limits/Boundaries Classroom Work Should Include Extension

Limit: square roots of perfect squares less than or equal to six hundred twenty-five and cube roots of perfect cubes less than or equal to one thousand.

Calculator Designation
NO – a calculator will not be available for items

Grade 8 Mathematics

<table>
<tr><th colspan="2">Mathematics</th><th>8.EEI.A.2.c</th></tr>
<tr><td>EEI</td><td colspan="2">Expressions, Equations and Inequalities</td></tr>
<tr><td>A</td><td colspan="2">Work with radicals and integer exponents.</td></tr>
<tr><td>2</td><td colspan="2">Investigate concepts of square and cube roots.</td></tr>
<tr><td>c</td><td colspan="2">Recognize that square roots of non-perfect squares are irrational.</td></tr>
<tr><td colspan="2"><u>Expectation Unwrapped</u>

The student will know that square roots of non-perfect squares are irrational.</td><td><u>DOK Ceiling</u>
3

<u>Item Format</u>
Selected Response
Constructed Response
Technology Enhanced

<u>Sample Stems</u></td></tr>
<tr><td colspan="2"><u>State Assessment Content Limits/Boundaries Classroom Work Should Include Extension</u>
Limit the square roots of perfect squares less than or equal to six hundred twenty-five.</td><td><u>Calculator Designation</u>
NO – a calculator will not be available for items</td></tr>
</table>

Grade 8 Mathematics

Mathematics		8.EEI.A.3
EEI **A** **3**	**Expressions, Equations and Inequalities** **Work with radicals and integer exponents.** Express very large and very small quantities in scientific notation and approximate how many times larger one is than the other.	

Expectation Unwrapped

The student will be able to express very large and very small quantities in scientific notation with the first factor written less than ten and equal to or greater than one.

Students will know that a number multiplied by a base of ten raised to a positive exponent, the equivalent expression will result in a larger number than the original factor.

Students will know that a number multiplied by a base of ten raised to a negative exponent will result in a smaller number than the original factor.

Students will approximate how many times larger one expression (written in scientific notation) is than another expression (written in scientific notation).

DOK Ceiling
3

Item Format
Selected Response
Constructed Response
Technology Enhanced

Sample Stems

State Assessment Content Limits/Boundaries Classroom Work Should Include Extension

Calculator Designation
NO – a calculator will not be available for items

Grade 8 Mathematics

Mathematics		8.EEI.A.4.a
EEI	**Expressions, Equations and Inequalities**	
A	**Work with radicals and integer exponents.**	
4	Use scientific notation to solve problems.	
a	Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used.	

Expectation Unwrapped

The student will be able to multiply two expressions written in scientific notation using integer exponent properties (including where at least 1 expression is in scientific notation).

The student will be able to divide two expressions written in scientific notation using integer exponent properties (including where at least 1 expression is in scientific notation).

The student will convert a number from standard notation into scientific notation to perform operations.

The student will add or subtract two expressions written in scientific notation when the power of ten is the same.

DOK Ceiling
3

Item Format
Selected Response
Constructed Response
Technology Enhanced

Sample Stems

State Assessment Content Limits/Boundaries Classroom Work Should Include Extension
Answers should be written in scientific notation.
Focus should be on multiplication and division and less on addition/subtraction.

Calculator Designation
NEUTRAL – a calculator may or may not be available for items

Grade 8 Mathematics

Mathematics		8.EEI.A.4.b
EEI	**Expressions, Equations and Inequalities**	
A	**Work with radicals and integer exponents.**	
4	Use scientific notation to solve problems.	
b	Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities.	

Expectation Unwrapped

The student will use scientific notation to choose unit of appropriate size for measurement.

Students will be able to determine the most reasonable and appropriate unit of measure to use in a given situation.

Students will use a calculator to input and interpret scientific notation.

DOK Ceiling
3

Item Format
Selected Response
Constructed Response
Technology Enhanced

Sample Stems

State Assessment Content Limits/Boundaries Classroom Work Should Include Extension

Calculator Designation
YES – a calculator will be available for items

Grade 8 Mathematics

Mathematics		8.EEI.B.5.a
EEI	**Expressions, Equations and Inequalities**	
B	**Understand the connections between proportional relationships, lines and linear equations.**	
5	Graph proportional relationships.	
a	Interpret the unit rate as the slope of the graph.	

Expectation Unwrapped

The student will interpret the unit rate (1, r) as the slope of the graph when given a proportional relationship.

The student will be able to use the unit rate (1, r) to graph a proportional relationship that passes through the origin.

DOK Ceiling
3

Item Format
Selected Response
Constructed Response
Technology Enhanced

Sample Stems

State Assessment Content Limits/Boundaries Classroom Work Should Include Extension
To assess if students make the connection between slope and the unit rate, the scale on the x-axis needs to increase by ones.

Calculator Designation
NEUTRAL – a calculator may or may not be available for items

Grade 8 Mathematics

Mathematics		8.EEI.B.5.b
EEI	**Expressions, Equations and Inequalities**	
B	**Understand the connections between proportional relationships, lines and linear equations.**	
5	Graph proportional relationships.	
b	Compare two different proportional relationships.	

Expectation Unwrapped

The student will compare the slopes of two proportional relationships given multiple representations including tables, graphs and equations.

DOK Ceiling
3

Item Format
Selected Response
Constructed Response
Technology Enhanced

Sample Stems

State Assessment Content Limits/Boundaries Classroom Work Should Include Extension

Values may include integers and/or decimals and fractions that simplify to the hundredths place.

Calculator Designation
YES – a calculator will be available for items

Grade 8 Mathematics

Mathematics		8.EEI.B.6.a
EEI	**Expressions, Equations and Inequalities**	
B	**Understand the connections between proportional relationships, lines and linear equations.**	
6	Apply concepts of slope and y-intercept to graphs, equations and proportional relationships.	
a	Explain why the slope (m) is the same between any two distinct points on a non-vertical line in the Cartesian coordinate plane.	

Expectation Unwrapped

The student will explain why the slope (m) is the same between any two distinct points on a non-vertical line in the Cartesian coordinate plane.

DOK Ceiling
3

Item Format
Selected Response
Constructed Response
Technology Enhanced

Sample Stems

State Assessment Content Limits/Boundaries Classroom Work Should Include Extension

Values may include integers and/or decimals and fractions that simplify to the hundredths place.

Calculator Designation
YES – a calculator will be available for items

Grade 8 Mathematics

Mathematics		8.EEI.B.6.b
EEI	**Expressions, Equations and Inequalities**	
B	**Understand the connections between proportional relationships, lines and linear equations.**	
6	Apply concepts of slope and y-intercept to graphs, equations and proportional relationships.	
b	Derive the equation y = mx for a line through the origin and the equation y = mx + b for a line intercepting the vertical axis at b.	

Expectation Unwrapped

The student will write an equation in slope-intercept form when given a table of values.

The student will write an equation in slope-intercept form when given a linear graph.

The student will write an equation in slope-intercept form when given two-points on a line.

The student will write an equation in slope-intercept form when given a real-world linear situation.

The student will write an equation in slope-intercept form when given the slope and the y-intercept of a line.

The student will write an equation in slope-intercept form when given the slope and one-point on the line.

DOK Ceiling
3

Item Format
Selected Response
Constructed Response
Technology Enhanced

Sample Stems

State Assessment Content Limits/Boundaries Classroom Work Should Include Extension
Values may include integers and/or decimals and fractions that simplify to the hundredths place.
When writing the equation from a graph, all coordinate pairs should be easily identifiable on intersecting grid lines.

Calculator Designation
YES – a calculator will be available for items

Grade 8 Mathematics

Mathematics		8.EEI.C.7.a
EEI	**Expressions, Equations and Inequalities**	
C	**Analyze and solve linear equations and inequalities and pairs of simultaneous linear equations.**	
7	Solve linear equations and inequalities in one variable.	
a	Create and identify linear equations with one solution, infinitely many solutions or no solutions.	

Expectation Unwrapped

The student will give examples of linear equations with one solution, infinitely many solutions or no solutions.

The student will identify linear equations with one solution, infinitely many solutions or no solutions.

DOK Ceiling
3

Item Format
Selected Response
Constructed Response
Technology Enhanced

Sample Stems

State Assessment Content Limits/Boundaries Classroom Work Should Include Extension

Calculator Designation
YES – a calculator will be available for items

Grade 8 Mathematics

Mathematics		8.EEI.C.7.b
EEI	**Expressions, Equations and Inequalities**	
C	**Analyze and solve linear equations and inequalities and pairs of simultaneous linear equations.**	
7	Solve linear equations and inequalities in one variable.	
b	Solve linear equations and inequalities with rational number coefficients, including equations and inequalities whose solutions require expanding expressions using the distributive property and combining like terms.	

Expectation Unwrapped

The student will solve linear equations with rational number coefficients in one variable with or without the distributive property and combining like terms.

The student will solve linear inequalities with rational number coefficients in one variable with or without the distributive property and combining like terms.

DOK Ceiling
3

Item Format
Selected Response
Constructed Response
Technology Enhanced

Sample Stems

State Assessment Content Limits/Boundaries Classroom Work Should Include Extension
Values may include integers and/or decimals and fractions that simplify to the hundredths place.

Calculator Designation
YES – a calculator will be available for items

Grade 8 Mathematics

Mathematics		8.EEI.C.8.a
EEI	**Expressions, Equations and Inequalities**	
C	**Analyze and solve linear equations and inequalities and pairs of simultaneous linear equations.**	
8	Analyze and solve systems of linear equations.	
a	Graph systems of linear equations and recognize the intersection as the solution to the system.	

Expectation Unwrapped

The student will graph systems of linear equations.

The student will recognize the intersection of two linear equations as the solution to a system.

DOK Ceiling
3

Item Format
Selected Response
Constructed Response
Technology Enhanced

Sample Stems

State Assessment Content Limits/Boundaries Classroom Work Should Include Extension
The scale of the coordinate grid should allow for the y-intercept to be graphed on a scale value.
Limited to only two equations, both in slope-intercept form.

Calculator Designation
NEUTRAL – a calculator may or may not be available for items

Grade 8 Mathematics

Mathematics		8.EEI.C.8.b
EEI	**Expressions, Equations and Inequalities**	
C	**Analyze and solve linear equations and inequalities and pairs of simultaneous linear equations.**	
8	Analyze and solve systems of linear equations.	
b	Explain why solution(s) to a system of two linear equations in two variables correspond to point(s) of intersection of the graphs.	

Expectation Unwrapped

The student will explain why two lines that never intersect will have no solution.

The student will explain why two lines that intersect at all points will have infinitely many solutions.

The student will explain why two lines that intersect at one point will have one solution.

When given a real-world context that can be modeled with a system of equations with one solution, the student will be able to explain what the solution (x, y) values represent.

DOK Ceiling
3

Item Format
Selected Response
Constructed Response
Technology Enhanced

Sample Stems

State Assessment Content Limits/Boundaries Classroom Work Should Include Extension

Calculator Designation
NEUTRAL – a calculator may or may not be available for items

Grade 8 Mathematics

<table>
<tr><th colspan="2">Mathematics</th><th>8.EEI.C.8.c</th></tr>
<tr><td>EEI</td><td colspan="2">Expressions, Equations and Inequalities</td></tr>
<tr><td>C</td><td colspan="2">Analyze and solve linear equations and inequalities and pairs of simultaneous linear equations.</td></tr>
<tr><td>8</td><td colspan="2">Analyze and solve systems of linear equations.</td></tr>
<tr><td>c</td><td colspan="2">Explain why systems of linear equations can have one solution, no solution or infinitely many solutions.</td></tr>
<tr><td colspan="2"><u>Expectation Unwrapped</u>

The student will explain why two linear equations with the same slope and different y-intercepts would have no solution.

The student will explain why two linear equations with the same slope and y-intercept would have infinitely many solutions.

The student will explain why two linear equations with different slopes would have one solution.</td><td><u>DOK Ceiling</u>
3

<u>Item Format</u>
Selected Response
Constructed Response
Technology Enhanced

<u>Sample Stems</u></td></tr>
<tr><td colspan="2"><u>State Assessment Content Limits/Boundaries Classroom Work Should Include Extension</u>
Students may determine the number of solutions using a graph, analyzing for slopes/y-intercepts or solving the system.</td><td><u>Calculator Designation</u>
YES – a calculator will be available for items</td></tr>
</table>

Grade 8 Mathematics

Mathematics		8.EEI.C.8.d
EEI	**Expressions, Equations and Inequalities**	
C	**Analyze and solve linear equations and inequalities and pairs of simultaneous linear equations.**	
8	Analyze and solve systems of linear equations.	
d	Solve systems of two linear equations.	

Expectation Unwrapped

The student will solve systems of two linear equations in two variables algebraically.

DOK Ceiling
3

Item Format
Selected Response
Constructed Response
Technology Enhanced

Sample Stems

State Assessment Content Limits/Boundaries Classroom Work Should Include Extension
Students may use substitution, elimination or inspection to solve systems.
Both equations should be provided in the same form.

Calculator Designation
YES – a calculator will be available for items

Grade 8 Mathematics

Mathematics		8.GM.A.1.a
GM	**Geometry and Measurement**	
A	**Understand congruence and similarity using physical models, transparencies or geometry software.**	
1	Verify experimentally the congruence properties of rigid transformations.	
a	Verify that angle measure, betweenness, collinearity and distance are preserved under rigid transformations.	

Expectation Unwrapped

The student will verify that angle measures are preserved under rigid transformations of rotations, reflections, and translations.

The student will verify that betweenness (the distance that point b is between point a and point c) is preserved under rigid transformations of rotations, reflections, and translations.

The student will verify that collinearity is preserved under rigid transformations of rotations, reflections, and translations.

The student will verify that distance is preserved under rigid transformations of rotations, reflections, and translations.

The student will verify that any line (including parallel lines) transformed under a rigid transformation of rotation, reflection, or translation will still be a line.

The student will verify that after a rigid transformation of rotation, reflection, or translation, corresponding angles are congruent.

The student will verify that after a rigid transformation of rotation, reflection, or translation, corresponding line segments are congruent.

DOK Ceiling
3

Item Format
Selected Response
Constructed Response
Technology Enhanced

Sample Stems

State Assessment Content Limits/Boundaries Classroom Work Should Include Extension
No more than two rigid transformations performed at one time should be assessed.
A sequence of two transformations is limited to vertices of the original figure existing in the same quadrant including the axes.

Calculator Designation
NEUTRAL – a calculator may or may not be available for items

Grade 8 Mathematics

Mathematics		8.GM.A.1.b
GM	**Geometry and Measurement**	
A	**Understand congruence and similarity using physical models, transparencies or geometry software.**	
1	Verify experimentally the congruence properties of rigid transformations.	
b	Investigate if orientation is preserved under rigid transformations.	

Expectation Unwrapped	**DOK Ceiling**
Investigate if orientation is preserved under rigid transformations.	2
	Item Format Selected Response Constructed Response Technology Enhanced
	Sample Stems

State Assessment Content Limits/Boundaries Classroom Work Should Include Extension	**Calculator Designation**
	YES – a calculator will be available for items

Grade 8 Mathematics

Mathematics		8.GM.A.2.a
GM	**Geometry and Measurement**	
A	**Understand congruence and similarity using physical models, transparencies or geometry software.**	
2	Understand that two-dimensional figures are congruent if a series of rigid transformations can be performed to map the pre-image to the image.	
a	Describe a possible sequence of rigid transformations between two congruent figures.	

Expectation Unwrapped

The student will understand that two-dimensional figures are congruent if a series of rigid transformations (rotations, reflections, translations) can be performed to map the pre-image to the image.

Given two congruent figures, the student will describe the sequence of rigid transformations (rotations, reflections, translations) that justifies the congruence between them.

DOK Ceiling
3

Item Format
Selected Response
Constructed Response
Technology Enhanced

Sample Stems

State Assessment Content Limits/Boundaries Classroom Work Should Include Extension
No more than two rigid transformations performed at one time should be assessed.
A sequence of two transformations is limited to vertices of the original figure existing in the same quadrant including the axes.
Limit rotations to 90◦, 180◦, 270◦.

Calculator Designation
NEUTRAL – a calculator may or may not be available for items

Grade 8 Mathematics

Mathematics		8.GM.A.3
GM A 3	**Geometry and Measurement** **Understand congruence and similarity using physical models, transparencies or geometry software.** Describe the effect of dilations, translations, rotations and reflections on two-dimensional figures using coordinates.	

Expectation Unwrapped

The student will describe the effect of dilations on two-dimensional figures using coordinates.

The student will describe the effect of rotations on two-dimensional figures using coordinates.

The student will describe the effect of reflections on two-dimensional figures using coordinates.

The student will describe the effect of translations on two-dimensional figures using coordinates.

DOK Ceiling
3

Item Format
Selected Response
Constructed Response
Technology Enhanced

Sample Stems

State Assessment Content Limits/Boundaries Classroom Work Should Include Extension
Limit the center of rotation to a vertex of the figure or the origin.
Limited to triangles and quadrilaterals or shapes that consist of triangles and quadrilaterals.
Limit rotations to 90◦, 180◦, 270◦.

Calculator Designation
YES – a calculator will be available for items

Grade 8 Mathematics

Mathematics		8.GM.A.4.a
GM	**Geometry and Measurement**	
A	**Understand congruence and similarity using physical models, transparencies or geometry software.**	
4	Understand that two-dimensional figures are similar if a series of transformations (rotations, reflections, translations and dilations) can be performed to map the pre-image to the image.	
a	Describe a possible sequence of transformations between two similar figures.	

Expectation Unwrapped

The student will understand that two-dimensional figures are similar if a series of rigid transformations (rotations, reflections, translations, and dilations) can be performed to map the pre-image to the image.

Given two similar figures, the student will describe the sequence of rigid transformations (rotations, reflections, translations, and dilations) that justifies the congruence between them.

DOK Ceiling
3

Item Format
Selected Response
Constructed Response
Technology Enhanced

Sample Stems

State Assessment Content Limits/Boundaries Classroom Work Should Include Extension
No more than two transformations performed at one time should be assessed

Calculator Designation
NEUTRAL – a calculator may or may not be available for items

Grade 8 Mathematics

<table>
<tr><th colspan="2">Mathematics</th><th>8.GM.A.5.a</th></tr>
<tr><td>GM
A
5
a</td><td colspan="2">Geometry and Measurement
Understand congruence and similarity using physical models, transparencies or geometry software.
Explore angle relationships and establish informal arguments.
Derive the sum of the interior angles of a triangle.</td></tr>
<tr><td colspan="2"><u>Expectation Unwrapped</u>

The student will establish informal arguments to derive the sum of the interior angles of a triangle.</td><td><u>DOK Ceiling</u>
3

<u>Item Format</u>
Selected Response
Constructed Response
Technology Enhanced

<u>Sample Stems</u></td></tr>
<tr><td colspan="2"><u>State Assessment Content Limits/Boundaries Classroom Work Should Include Extension</u>
Students are not required to give formal proofs at this point.
Values may include integers and/or decimals the tenths place.
Students will not be required to identify angles by name at this level. (e.g., alternate interior angles, alternate exterior angles)</td><td><u>Calculator Designation</u>
YES – a calculator will be available for items</td></tr>
</table>

Grade 8 Mathematics

<table>
<tr><th colspan="2">Mathematics</th><th>8.GM.A.5.b</th></tr>
<tr><td>GM</td><td colspan="2">Geometry and Measurement</td></tr>
<tr><td>A</td><td colspan="2">Understand congruence and similarity using physical models, transparencies or geometry software.</td></tr>
<tr><td>5</td><td colspan="2">Explore angle relationships and establish informal arguments.</td></tr>
<tr><td>b</td><td colspan="2">Explore the relationship between the interior and exterior angles of a triangle.</td></tr>
<tr><td colspan="2"><u>Expectation Unwrapped</u>

The student will establish informal arguments to explore the relationship between the interior and exterior angles of a triangle.</td><td><u>DOK Ceiling</u>
3

<u>Item Format</u>
Selected Response
Constructed Response
Technology Enhanced

<u>Sample Stems</u></td></tr>
<tr><td colspan="2"><u>State Assessment Content Limits/Boundaries Classroom Work Should Include Extension</u>
Students are not required to give formal proofs at this point.
Values may include integers and/or decimals the tenths place.
Students will not be required to identify angles by name at this level. (e.g., alternate interior angles, alternate exterior angles)</td><td><u>Calculator Designation</u>
YES – a calculator will be available for items</td></tr>
</table>

Mathematics		8.GM.A.5.c
GM	**Geometry and Measurement**	
A	**Understand congruence and similarity using physical models, transparencies or geometry software.**	
5	Explore angle relationships and establish informal arguments.	
c	Construct and explore the angles created when parallel lines are cut by a transversal.	

Expectation Unwrapped

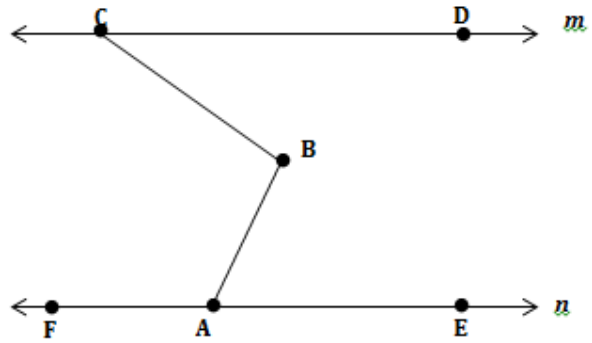
The student will construct parallel lines cut by a transversal.

The student will establish informal arguments to explore angles created when parallel lines are cut by a transversal.

DOK Ceiling
3

Item Format
Selected Response
Constructed Response
Technology Enhanced

Sample Stems
In the picture below, line m and line n are parallel. The measure of angle DCB is 48◦. The measure of angle FAB is 105◦. What is the measure of angle CBA?



State Assessment Content Limits/Boundaries Classroom Work Should Include Extension
Students are not required to give formal proofs at this point.
Values may include integers and/or decimals the tenths place.
Students will not be required to identify angles by name at this level. (e.g., alternate interior angles, alternate exterior angles)

Calculator Designation
YES – a calculator will be available for items

Grade 8 Mathematics

<table>
<tr><th colspan="2">Mathematics</th><th>8.GM.A.5.d</th></tr>
<tr><td>GM
A
5
d</td><td colspan="2">Geometry and Measurement
Understand congruence and similarity using physical models, transparencies or geometry software.
Explore angle relationships and establish informal arguments.
Use the properties of similar figures to solve problems.</td></tr>
<tr><td colspan="2"><u>Expectation Unwrapped</u>

The student will establish informal arguments to use properties (congruent corresponding angles) of similar figures to solve problems.</td><td><u>DOK Ceiling</u>
3

<u>Item Format</u>
Selected Response
Constructed Response
Technology Enhanced

<u>Sample Stems</u></td></tr>
<tr><td colspan="2"><u>State Assessment Content Limits/Boundaries Classroom Work Should Include Extension</u>
Students are not required to give formal proofs at this point.
Values may include integers and/or decimals the tenths place
Students will not be required to identify angles by name at this level. (e.g., alternate interior angles, alternate exterior angles)</td><td><u>Calculator Designation</u>
YES – a calculator will be available for items</td></tr>
</table>

Grade 8 Mathematics

Mathematics		8.GM.B.6
GM B 6	**Geometry and Measurement** **Understand and apply the Pythagorean Theorem** Use models to demonstrate a proof of the Pythagorean Theorem and its converse.	
Expectation Unwrapped The student will use models to demonstrate a proof of the Pythagorean Theorem. The student will use models to demonstrate a proof of the converse of the Pythagorean Theorem. Models can include pictorial, graphic as well as equations. The student will use the Pythagorean Theorem to prove that three lengths can make a right triangle.		**DOK Ceiling** 3 **Item Format** Selected Response Constructed Response Technology Enhanced **Sample Stems**
State Assessment Content Limits/Boundaries Classroom Work Should Include Extension Values may include integers and/or decimals.		**Calculator Designation** **YES** – a calculator will be available for items

Grade 8 Mathematics

Mathematics		8.GM.B.7
GM **B** **7**	**Geometry and Measurement** **Understand and apply the Pythagorean Theorem** Use the Pythagorean Theorem to determine unknown side lengths in right triangles in problems in two- and three-dimensional contexts.	
Expectation Unwrapped The student will use the Pythagorean Theorem to determine unknown side lengths in right triangles in problems in two-dimensional contexts. The student will use the Pythagorean Theorem to determine unknown side lengths in right triangles in problems in three-dimensional contexts.		**DOK Ceiling** 3 **Item Format** Selected Response Constructed Response Technology Enhanced **Sample Stems**
State Assessment Content Limits/Boundaries Classroom Work Should Include Extension Answers could appear in non-simplified radical form.		**Calculator Designation** **YES** – a calculator will be available for items

Grade 8 Mathematics

Mathematics		8.GM.B.8
GM **B** **8**	**Geometry and Measurement** **Understand and apply the Pythagorean Theorem** Use the Pythagorean Theorem to find the distance between points in a Cartesian coordinate system.	
Expectation Unwrapped The student will use the Pythagorean Theorem to find the distance between points in a Cartesian coordinate plane.		**DOK Ceiling** 3 **Item Format** Selected Response Constructed Response Technology Enhanced **Sample Stems**
State Assessment Content Limits/Boundaries Classroom Work Should Include Extension Values may include integers and/or decimals.		**Calculator Designation** **YES** – a calculator will be available for items

Grade 8 Mathematics

Mathematics		8.GM.C.9.a
GM	**Geometry and Measurement**	
C	**Solve problems involving volume of cones, pyramids and spheres.**	
9	Solve problems involving surface area and volume.	
a	Understand the concept of surface area and find surface area of pyramids.	

Expectation Unwrapped

The student will understand the concept of surface area of a pyramid.

The student will find the surface area of a pyramid.

DOK Ceiling
3

Item Format
Selected Response
Constructed Response
Technology Enhanced

Sample Stems

State Assessment Content Limits/Boundaries Classroom Work Should Include Extension
Pyramids will have a triangular or rectangular base.
This may include a real-world context.

Calculator Designation
YES – a calculator will be available for items

Grade 8 Mathematics

Mathematics		8.GM.C.9.b
GM	**Geometry and Measurement**	
C	**Solve problems involving volume of cones, pyramids and spheres.**	
9	Solve problems involving surface area and volume.	
b	Understand the concepts of volume and find the volume of pyramids, cones and spheres.	

Expectation Unwrapped

The student will understand the concept of volume of pyramids.

The student will understand the concept of volume of cones.

The student will understand the concept of volume of spheres.

The student will find the volume of pyramids.

The student will find the volume of cones.

The student will find the volume of spheres.

DOK Ceiling
3

Item Format
Selected Response
Constructed Response
Technology Enhanced

Sample Stems

State Assessment Content Limits/Boundaries Classroom Work Should Include Extension
Given measurements will be whole numbers.
Will not have composite figures.
Answers may be given in terms of π.

Calculator Designation
YES – a calculator will be available for items

Grade 8 Mathematics

<table>
<tr><th colspan="2">Mathematics</th><th>8.DSP.A.1</th></tr>
<tr><td>DSP
A
1</td><td colspan="2">Data Analysis, Statistics and Probability
Investigate patterns of association in bivariate data.
Construct and interpret scatter plots of bivariate measurement data to investigate patterns of association between two quantities.</td></tr>
<tr><td colspan="2"><u>Expectation Unwrapped</u>

The student will construct a scatter plot of bivariate measurement data.

The student will interpret a scatter plot of bivariate measurement data to identify clustering.

The student will interpret a scatter plot of bivariate measurement data to identify outliers.

The student will interpret a scatter plot of bivariate measurement data to identify a positive or negative association.

The student will interpret a scatter plot of bivariate measurement data to identify a linear or non-linear association.</td><td><u>DOK Ceiling</u>
3

<u>Item Format</u>
Selected Response
Constructed Response
Technology Enhanced

<u>Sample Stems</u></td></tr>
<tr><td colspan="2"><u>State Assessment Content Limits/Boundaries Classroom Work Should Include Extension</u>
Outliers should be obscure enough to be identified through inspection.</td><td><u>Calculator Designation</u>
NEUTRAL – a calculator may or may not be available for items</td></tr>
</table>

Grade 8 Mathematics

Mathematics		8.DSP.A.2
DSP A 2	**Data Analysis, Statistics and Probability** **Investigate patterns of association in bivariate data.** Generate and use a trend line for bivariate data, and informally assess the fit of the line.	

Expectation Unwrapped

The student will understand that not all trend lines start at the origin.

The student will know that not all trend lines pass through the data points.

The student will construct a line of best fit to model trends in a set of bivariate data.

The student will use a straight line to model relationships between two quantitative variables for a scatter plot.

The student will informally assess the fit of the line of best fit by evaluating the closeness of the data points to the line.

DOK Ceiling
3

Item Format
Selected Response
Constructed Response
Technology Enhanced

Sample Stems

State Assessment Content Limits/Boundaries Classroom Work Should Include Extension
Students should be able to explain that a line of best fit that is very close to the data points has a strong fit to the data set.
A line of best fit that is further from the data points has a weaker fit to the data set. On the graph the y-intercept and at least two coordinate pairs must clearly fall on intersections of the coordinate grid lines.

Calculator Designation
NEUTRAL – a calculator may or may not be available for items

Grade 8 Mathematics

Mathematics		8.DSP.A.3
DSP A 3	**Data Analysis, Statistics and Probability** **Investigate patterns of association in bivariate data.** Interpret the parameters of a linear model of bivariate measurement data to solve problems.	

Expectation Unwrapped

The student will use the equation for the line of best fit to solve problems in the context of a bivariate measurement data set.

The student will interpret the slope and y-intercept in the line of best fit to solve problems in the context of a bivariate measurement data set.

DOK Ceiling
3

Item Format
Selected Response
Constructed Response
Technology Enhanced

Sample Stems

State Assessment Content Limits/Boundaries Classroom Work Should Include Extension
Limit the coordinate grid to only the first quadrant.
Limit the data set to ten values.
Values may include integers and/or decimals and fractions that simplify to the hundredths place.
On the graph the y-intercept and at least two coordinate pairs must clearly fall on intersections of the coordinate grid lines.

Calculator Designation
YES – a calculator will be available for items

Grade 8 Mathematics

Mathematics		8.DSP.A.4.a
DSP	**Data Analysis, Statistics and Probability**	
A	**Investigate patterns of association in bivariate data.**	
4	Understand the patterns of association in bivariate categorical data displayed in a two-way table.	
a	Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects.	

Expectation Unwrapped

The student will construct a two-way table summarizing data on two categorical variables collected from the same subjects.

The student will interpret a two-way table summarizing data on two categorical variables collected from the same subjects.

DOK Ceiling
3

Item Format
Selected Response
Constructed Response
Technology Enhanced

Sample Stems
May want an example of a two-way table

State Assessment Content Limits/Boundaries Classroom Work Should Include Extension
Values may include integers and/or decimals and fractions that simplify to the hundredths place.
Column and row totals should be shown on the tables.

Calculator Designation
YES – a calculator will be available for items

Grade 8 Mathematics

Mathematics		8.DSP.A.4.b
DSP	**Data Analysis, Statistics and Probability**	
A	**Investigate patterns of association in bivariate data.**	
4	Understand the patterns of association in bivariate categorical data displayed in a two-way table.	
b	Use relative frequencies calculated for rows or columns to describe possible association between the two variables.	

Expectation Unwrapped

The student will use relative frequencies calculated for rows or columns to describe possible association between the two variables.

DOK Ceiling
3

Item Format
Selected Response
Constructed Response
Technology Enhanced

Sample Stems

State Assessment Content Limits/Boundaries Classroom Work Should Include Extension
Column and row totals should be shown on the tables.

Calculator Designation
YES – a calculator will be available for items

Grade 8 Mathematics

Mathematics		8.F.A.1.a
F	**Functions**	
A	**Define, evaluate and compare functions.**	
1	Explore the concept of functions. (The use of function notation is not required.)	
a	Understand that a function assigns to each input exactly one output.	

Expectation Unwrapped

The student will understand that a function assigns every input (x-value) to exactly one output (y-value).

DOK Ceiling
3

Item Format
Selected Response
Constructed Response
Technology Enhanced

Sample Stems

State Assessment Content Limits/Boundaries Classroom Work Should Include Extension
The use of function notation is not required.
Values may include integers and/or decimals and fractions that simplify to the hundredths place.
Do not use “domain” or “range” vocabulary.

Calculator Designation
NEUTRAL – a calculator may or may not be available for items

Grade 8 Mathematics

Mathematics		8.F.A.1.b
F	**Functions**	
A	**Define, evaluate and compare functions.**	
1	Explore the concept of functions. (The use of function notation is not required.)	
b	Determine if a relation is a function.	

Expectation Unwrapped

The student will be able to determine if a relation is a function by using multiple representations, such as a mapping diagram, a set of ordered pairs, a table and/or a graph.

DOK Ceiling
3

Item Format
Selected Response
Constructed Response
Technology Enhanced

Sample Stems

State Assessment Content Limits/Boundaries Classroom Work Should Include Extension
Multiple representations may include a mapping diagram, a set of ordered pairs, a table and/or a graph.
The use of function notation is not required.
Values may include integers and/or decimals and fractions that simplify to the hundredths place.

Calculator Designation
NEUTRAL – a calculator may or may not be available for items

Grade 8 Mathematics

<table>
<tr><th colspan="2">Mathematics</th><th>8.F.A.1.c</th></tr>
<tr><td>F
A
1
c</td><td colspan="2">Functions
Define, evaluate and compare functions.
Explore the concept of functions. (The use of function notation is not required.)
Graph a function.</td></tr>
<tr><td colspan="2"><u>Expectation Unwrapped</u>

When given a set of input and output values, students will be able to graph a function on a coordinate grid.</td><td><u>DOK Ceiling</u>
3

<u>Item Format</u>
Selected Response
Constructed Response
Technology Enhanced

<u>Sample Stems</u></td></tr>
<tr><td colspan="2"><u>State Assessment Content Limits/Boundaries Classroom Work Should Include Extension</u>
The use of function notation is not required.
Values may include integers and/or decimals and fractions that simplify to the hundredths place.</td><td><u>Calculator Designation</u>
NEUTRAL – a calculator may or may not be available for items</td></tr>
</table>

Grade 8 Mathematics

<table>
<tr><th colspan="2">Mathematics</th><th>8.F.A.2</th></tr>
<tr><td>F
A
2</td><td colspan="2">Functions
Define, evaluate and compare functions.
Compare characteristics of two functions each represented in a different way.</td></tr>
<tr><td colspan="2"><u>Expectation Unwrapped</u>

The student will compare the slope (rate of change) of two functions represented in a different way.

The student will compare the y-intercept (initial value) of two functions represented in a different way.</td><td><u>DOK Ceiling</u>
3

<u>Item Format</u>
Selected Response
Constructed Response
Technology Enhanced

<u>Sample Stems</u></td></tr>
<tr><td colspan="2"><u>State Assessment Content Limits/Boundaries Classroom Work Should Include Extension</u>
Values may include integers and/or decimals and fractions that simplify to the hundredths place.
This comparison will only address linear functions. 8.F.A.3 will address non-linear vs. linear functions.</td><td><u>Calculator Designation</u>
YES – a calculator will be available for items</td></tr>
</table>

Grade 8 Mathematics

Mathematics		8.F.A.3.a
F	**Functions**	
A	**Define, evaluate and compare functions.**	
3	Investigate the differences between linear and nonlinear functions.	
a	Interpret the equation y = mx + b as defining a linear function, whose parameters are the slope (m) and the y-intercept (b).	

Expectation Unwrapped

The students will interpret the equation y = mx + b as defining a linear function, whose graph is a straight line.

The students will interpret that (m) represents the slope.

The students will interpret that (b) represents the y-intercept.

DOK Ceiling
3

Item Format
Selected Response
Constructed Response
Technology Enhanced

Sample Stems

State Assessment Content Limits/Boundaries Classroom Work Should Include Extension
Values may include integers and/or decimals and fractions that simplify to the hundredths place.

Calculator Designation
YES – a calculator will be available for items

Grade 8 Mathematics

Mathematics		8.F.A.3.b
F	**Functions**	
A	**Define, evaluate and compare functions.**	
3	Investigate the differences between linear and nonlinear functions.	
b	Recognize that the graph of a linear function has a constant rate of change.	

Expectation Unwrapped

The student will recognize that the graph of a linear function has a constant rate of change.

DOK Ceiling
3

Item Format
Selected Response
Constructed Response
Technology Enhanced

Sample Stems

State Assessment Content Limits/Boundaries Classroom Work Should Include Extension
This only addresses a graph of a linear function. Coordinate pairs must be clearly labeled with a point and fall on intersections of the coordinate grid.

Calculator Designation
YES – a calculator will be available for items

Grade 8 Mathematics

Mathematics		8.F.A.3.c
F	**Functions**	
A	**Define, evaluate and compare functions.**	
3	Investigate the differences between linear and nonlinear functions.	
c	Give examples of nonlinear functions.	

Expectation Unwrapped

The student will be able to give examples of a nonlinear function as a list of points, a table, a graph, an equation or a real world-context.

DOK Ceiling
3

Item Format
Selected Response
Constructed Response
Technology Enhanced

Sample Stems

State Assessment Content Limits/Boundaries Classroom Work Should Include Extension
Responses should be limited to "nonlinear" without having to describe function.

Calculator Designation
NEUTRAL – a calculator may or may not be available for items

Grade 8 Mathematics

Mathematics		8.F.B.4.a
F	**Functions**	
B	**Use functions to model relationships between quantities.**	
4	Use functions to model linear relationships between quantities.	
a	Explain the parameters of a linear function based on the context of a problem.	

Expectation Unwrapped

The student will explain that the slope is the constant rate of change and describe what this means in the context of a given situation.

The student will explain that the initial value is the y-intercept and describe what this means in the context of a given situation.

DOK Ceiling
3

Item Format
Selected Response
Constructed Response
Technology Enhanced

Sample Stems

State Assessment Content Limits/Boundaries Classroom Work Should Include Extension

Calculator Designation
NEUTRAL – a calculator may or may not be available for items

Grade 8 Mathematics

Mathematics		8.F.B.4.b
F	**Functions**	
B	**Use functions to model relationships between quantities.**	
4	Use functions to model linear relationships between quantities.	
b	Determine the parameters of a linear function.	

Expectation Unwrapped

The student will determine the slope of a linear function given a description of the relationships or from two points, tables, or graphs.

The student will determine the y-intercept of a linear function given a description of the relationships or from two points, tables, or graphs.

DOK Ceiling
3

Item Format
Selected Response
Constructed Response
Technology Enhanced

Sample Stems

State Assessment Content Limits/Boundaries Classroom Work Should Include Extension
Values may include integers and/or decimals and fractions that simplify to the hundredths place.
If the item includes a graph, the coordinate pairs must be clearly labeled with a point and fall on intersections of the coordinate grid.

Calculator Designation
YES – a calculator will be available for items

Grade 8 Mathematics

Mathematics		8.F.B.4.c
F	**Functions**	
B	**Use functions to model relationships between quantities.**	
4	Use functions to model linear relationships between quantities.	
c	Determine the x-intercept of a linear function.	

Expectation Unwrapped

The student will identify an x-intercept from a graph and determine its meaning In the context of a given situation.

The student will identify an x-intercept from a table and determine its meaning In the context of a given situation.

The student will identify an x-intercept from an equation (e.g., in slope-intercept form y=mx+b or standard form ax+by=c) and determine its meaning In the context of a given situation.

DOK Ceiling
3

Item Format
Selected Response
Constructed Response
Technology Enhanced

Sample Stems

State Assessment Content Limits/Boundaries Classroom Work Should Include Extension
Values may include integers and/or decimals and fractions that simplify to the hundredths place.
If the item includes a graph, the coordinate pairs must be clearly labeled with a point and fall on intersections of the coordinate grid lines.

Calculator Designation
YES – a calculator will be available for items

Grade 8 Mathematics

Mathematics		8.F.B.5
F **B** **5**	**Functions** **Use functions to model relationships between quantities.** Describe the functional relationship between two quantities from a graph or a verbal description.	

Expectation Unwrapped

The student will describe the functional relationship between two quantities from a graph.

The student will sketch a graph when given a description of the functional relationship.

DOK Ceiling
3

Item Format
Selected Response
Constructed Response
Technology Enhanced

Sample Stems

State Assessment Content Limits/Boundaries Classroom Work Should Include Extension
Description of the functional relationship could include increasing/decreasing, linear/nonlinear, continuous/discrete, and/or constant.
Students are not expected to calculate the average rate of change for a nonlinear or discontinuous function.

Calculator Designation
NEUTRAL – a calculator may or may not be available for items