Grade 8 Mathematics Instructional Materials Scoring Rubric

Introduction:

The following Instructional Materials Scoring Rubric for Mathematics is designed to score materials in the following

categories:

- Instructional Focus
- Math Practices
- Aspects of Rigor
- Accessibility Features

Scoring:

Each section is to be scored using a 0, 1, or 2. For all sections, except for Rigor, use the following rubric when deciding on the appropriate rating:

- 0: The metric is not present within the material.
- 1: The metric is present within the material. The intent and/or frequency component of the metric is not fully met.
- 2: A rating of 2 indicates the metric is present and all aspects of the metric are fully met.

For Rigor:

- 0: The standard is not instructionally present within the material.
- 1: The standard is instructionally present but does not have an instructional focus on the indicated type of rigor.
- 2: The standard is instructionally present and has a clear instructional focus on the indicated type of rigor.

Note: Some standards appear under multiple aspects of rigor (i.e., Conceptual Understanding, Procedural Fluency, or Application). When scoring these standards, only score the part of the standard relevant to that aspect of rigor, which is identified by a bold, italics, larger font.

Grade 8 Mathematics Instructional Materials Scoring Rubric

Gateway: The publisher must provide a Tennessee standards alignment guide as a part of the scope and sequence for the material. If this gateway is not met, the materials will not be scored.

Instructional Focus				
	0	**1**	**2**	**Evidence**
Connections to content from prior grades are clearly identified and explicitly related to grade-level work.				
Materials embed a minimum of 3 tasks in every unit. Each task has multiple entry-points and can be solved using a minimum of 2 solution strategies and/or representations.				
Materials give students opportunities to work problems within each lesson. Each problem set: • Covers the full breadth of the standard(s) covered in the lesson • Is aligned to on grade level expectations as identified in the standard(s)				
Teacher resources indicate common student misconceptions in every unit and provide guidance on how to instructionally address the identified misconceptions.				
Materials provide educative supports (e.g., adult level explanations of the standards) in every lesson for teachers to ensure standards are taught accurately and to the appropriate level of rigor (i.e., conceptual understanding, procedural fluency, and application) as indicated by the standards.				
Materials develop student understanding of multiple representations (i.e., concrete, representational, abstract) for relevant standards which are identified in the state's Instructional Focus Documents.				
Materials include problems and activities in every unit that connect two or more grade level standards in a domain (e.g., 7.EE.A.1 and 7.EE.A.2).				
Materials include problems and activities in every unit that connect two or more grade level domains. (e.g., 7.RP.A.3 and 7.EE.B.3)				
Materials provide opportunities for students to participate in a spiraled review in every unit.				
			Total	

Grade 8 Mathematics Instructional Materials Scoring Rubric

Gateway: The publisher must provide a Tennessee standards alignment guide as a part of the scope and sequence for the material. If this gateway is not met, the materials will not be scored.

Mathematical Practices				
Math Practices/Literacy Skills for Math Proficiency	**0**	**1**	**2**	**Evidence**
Materials embed the eight math practice standards in every unit.				
Math practice standards are clearly identified in both teacher and student materials.				
Materials use appropriate math vocabulary which is aligned to the grade level standards.				
Materials support students in discussing and articulating mathematical ideas. Within each lesson students either write or verbally justify their thoughts.				
			Total	

Accessibility Features				
Digital Materials	**0**	**1**	**2**	**Evidence**
All lessons within the materials are available in digital form and include a printable option.				
In every lesson, materials include recommended supports, accommodations, and modifications for Students with Disabilities and English Language Learners that will support their regular and active participation in accessing on grade level material (e.g., modifying vocabulary words within word problems, sentence starters, etc.).				
			Total	

Grade 8 Mathematics Instructional Materials Scoring Rubric

Aspects of Rigor				
Conceptual Understanding: The materials support the intentional development of students' conceptual understanding of key mathematical concepts, especially where called for in specific content standards or clusters.	**0**	**1**	**2**	**Evidence**
8.NS.A.1 Know that real numbers that are not rational are called irrational (e.g., π, √2, etc.). Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually or terminates, and convert a decimal expansion which repeats eventually or terminates into a rational number.				
8.NS.A.2 Use rational approximations of irrational numbers to ***compare the size of irrational numbers by locating them approximately on a number line diagram. Estimate the value of irrational expressions (such as π2).***				
8.EE.A.1 Know and ***apply the properties of integer exponents to generate equivalent numerical expressions.***				
8.EE.A.2 Use square root and cube root symbols to ***represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number.*** Evaluate square roots of small perfect squares and cube roots of small perfect cubes.				
8.EE.A.3 Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities and to express how many times as much one is than the other.				
8.EE.A.4 Using technology, solve real-world problems with numbers expressed in decimal and scientific notation. Use scientific notation and ***choose units of appropriate size for measurements of very large or very small quantities*** (e.g., use millimeters per year for seafloor spreading).				
8.EE.B.5 Graph proportional relationships, ***interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways.***				
8.EE.B.6 Use similar triangles to ***explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane***; know and apply 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.				

8.EE.C.7a Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form x = a, a = a, or a = b results (where a and b are different numbers).				
8.EE.C.8 ***Analyze*** and solve ***systems of two linear equations graphically***.				
8.EE.C.8a Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.				
8.EE.C.8b ***Estimate solutions*** by graphing a system of two linear equations in two variables. ***Identify solutions by inspecting graphs.***				
8.EE.C.9 By graphing on the coordinate plane or by ***analyzing a given graph, determine the solution set of a linear inequality in one or two variables.***				
8.F.A.1 Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output. (Function notation is not required in 8th grade.)				
8.F.A.2 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).				
8.F.A.3 Know and ***interpret the equation y = mx + b as defining a linear function, whose graph is a straight line; give examples of functions that are not linear.***				
8.F.B.4 Construct a function to *model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or* from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models and in terms of its graph or a table of values.				
8.G.A.1 Describe the effect of translations, rotations, reflections, and dilations on				
8.G.A.1a Verify informally that lines are taken to lines, and determine when line segments are taken to line segments of the same length.				
8.G.A.1b Verify informally that angles are taken to angles of the same measure.				
8.G.A.1c Verify informally that parallel lines are taken to parallel lines.				
8.G.A.1d Make connections between dilations and scale factors.				

8.G.A.2 Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles.				
8.G.B.3 Explain a model of the Pythagorean Theorem and its converse.				
8.G.B.4 Know and apply the Pythagorean Theorem to ***determine unknown side lengths in right triangles*** in real-world and mathematical problems in two and three dimensions.				
8.SP.A.1 Construct and ***interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.***				
8.SP.A.2 Know that straight lines are widely used to model linear relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line and informally assess the model fit by judging the closeness of the data points to the line.				
8.SP.A.3 Use the equation of a linear model to ***solve problems in the context of bivariate measurement data, interpreting the slope and intercepts.***				
8.SP.B.4 Find probabilities of and ***represent sample spaces for compound events using organized lists, tables, tree diagrams, and simulation.***				
8.SP.B.4a Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.				
8.SP.B.4b Represent sample spaces for compound events using methods such as organized lists, tables, and tree diagrams. For an event described in everyday language (e.g., "rolling double sixes"), identify the outcomes in the sample space which compose the event.				
Procedural Skill and Fluency: The materials provide intentional opportunities for students to develop procedural skills and fluencies, especially where called for in specific content standards or clusters	**0**	**1**	**2**	**Evidence**
8.NS.A.2 ***Use rational approximations of irrational numbers*** to compare the size of irrational numbers by locating them approximately on a number line diagram. Estimate the value of irrational expressions (such as π2				
8.EE.A.1 ***Know and apply the properties of integer exponents to generate equivalent numerical expressions.***				

8.EE.A.2 Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. ***Evaluate square roots of small perfect squares and cube roots of small perfect cubes.***				
8.EE.A.4 Using technology, solve real-world problems with numbers expressed in decimal and scientific notation***. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading).***				
8.EE.B.5 ***Graph proportional relationships***, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways.				
8.EE.B.6 ***Use similar triangles*** to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; ***know and apply 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.***				
8.EE.C.7 Solve linear equations in one variable.				
8.EE.C.7b Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and combining like terms.				
8.EE.C.8 Analyze and ***solve systems of two linear equations graphically***.				
8.EE.C.8b Estimate solutions by ***graphing a system of two linear equations in two variables.*** Identify solutions by inspecting graphs.				
8.EE.C.9 ***By graphing on the coordinate plane*** or by analyzing a given graph, determine the solution set of a linear inequality in one or two variables.				
8.F.A.3 ***Know*** and interpret ***the equation y = mx + b as defining a linear function, whose graph is a straight line***; give examples of functions that are not linear.				
8.F.B.5 Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.				
8.G.B.4 ***Know and apply the Pythagorean Theorem to determine unknown side lengths in right triangles*** in real-world and mathematical problems ***in two and three dimensions.***				

8.G.B.5 Apply the Pythagorean Theorem to find the distance between two points in a coordinate system**.**				
8.G.C.6 Apply the formulas for the volumes of cones, cylinders, and spheres to **solve** real-world and mathematical problems.				
8.SP.A.1 ***Construct*** and interpret ***scatter plots for bivariate measurement data to investigate patterns of association between two quantities.*** Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.				
8.SP.A.3 ***Use the equation of a linear model to solve problems in the context of bivariate measurement data***, interpreting the slope and intercepts.				
8.SP.B.4 ***Find probabilities of*** and represent sample spaces for ***compound events using organized lists, tables, tree diagrams, and simulation.***				
Applications: The materials support the intentional development of students' ability to utilize mathematical concepts and skills in engaging applications, especially where called for in specific content standards or clusters.	**0**	**1**	**2**	**Evidence**
8.EE.A.1 Know and ***apply the properties of integer exponents to generate equivalent numerical expressions.***				
8.EE.A.4 Using technology, ***solve real-world problems*** with numbers expressed in decimal and scientific notation. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading).				
8.EE.B.6 Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; know and ***apply 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.***				
8.EE.C.8b Estimate solutions by graphing a system of two linear equations in two variables. Identify solutions by inspecting graphs.				
8.G.B.4 Know and ***apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.***				
8.G.C.6 Apply the formulas for the volumes of cones, cylinders, and spheres to solve real-world and mathematical problems.				
8.SP.A.3 Use the equation of a linear model to ***solve problems in the context of bivariate measurement data***, interpreting the slope and intercepts.				
Total				