Plan for Grade 8 Unit 5: Functions and Volume

Relevant Unit(s) to review: Grade 7 Unit 2: Introducing Proportional Relationships

Essential prior concepts to engage with this unit	Prior concepts that will allow students to engage with this unit stem for grades 6 and 7. These concepts are: • identifying independent and dependent variables • constant of proportionality • rate of change • slope
Brief narrative of approach	In the unit, we focus on graphing and interpreting functions, rate of change and creating and interpreting linear and nonlinear functions. If additional time is needed for adding lessons to other units, consider moving more quickly through the last three sections: Cylinders and Cones, Dimensions and Spheres, and Let's Put It to Work. Begin by identifying a function, learning to understand "input", "output", and function (8.F.A.1) and that a function is a rule that produces a single output for a given input. This leads to analyzing functions with tables, graphs, and equations (8.F.A.1, 8.F.A.3). Finally, students transition to linear functions and create graphs of linear and nonlinear functions. (8.F.B)

Lessons to Add	**Lessons to Remove or Modify**
This unit should provide sufficient background to engage with the material on its own. If additional resources are needed to increase familiarity with proportional relationships, Grade 7 Unit 2 may be useful to revisit.	1. Remove 8.5.6 - Application lesson and activities that can be moved to outside of class for more practice 2. Remove 8.5.17 - optional lesson for the unit 3. Remove 8.5.18 - optional lesson for the unit 4. Move 8.5.22 to outside of class
Lessons added: 0	Lessons removed: 4

Modified Plan for Grade 8 Unit 5

Day	IM lesson	Notes
	assessment	8.5 Check Your Readiness Assessment Note that the Check Your Readiness assessment includes item-by-item guidance to inform just-in-time adjustments to instruction within the lessons in 8.5.
1	8.5.1	Identify a rule that describes the relationship between input-output pairs and explain (orally) a strategy used for figuring out the rule.
2	8.5.2	Comprehend the structure of a function as having one and only one output for each allowable input.
3	8.5.3	Calculate the output of a function for a given input using an equation in two variables, and interpret (orally and in writing) the output in context.
4	8.5.4	Determine whether a graph represents a function, and explain (orally) the reasoning.
5	8.5.5	Describe (orally and in writing) a graph of a function as "increasing" or "decreasing" over an interval, and explain (orally) the reasoning.
6	8.5.7	Interpret multiple representations of functions, including graphs, tables, and equations, and explain (orally) how to find information in each type of representation.
7	8.5.8	Comprehend that any linear function can be represented by an equation in the form $y = mx + b$.
8	8.5.9	Compare and contrast (orally and in writing) different linear models of the same data, and determine (in writing) the range of values for which a given model is a good fit for the data.
9	8.5.10	Calculate the different rates of change of a piecewise linear function using a graph, and interpret (orally and in writing) the rates of change in context.
10	Mid-Unit	Use questions from the 8.5 Mid-Unit Assessment.

	Assessment	
11	8.5.11	Create a graph of a function from collected data, and interpret (in writing) a point on the graph.
12	8.5.12	Estimate the volumes of various containers using different units of measure, and explain (orally) the reasoning.
13	8.5.13	Calculate the volume of a cylinder, and compare and contrast (orally) the formula for volume of a cylinder with the formula for volume of a prism.
14	8.5.14	Calculate the value of one dimension of a cylinder, and explain (orally and in writing) the reasoning.
15	8.5.15	Calculate the volume of a cone and cylinder given the height and radius, and explain (orally) the solution method.
16	8.5.16	Calculate the value of one dimension of a cylinder, and explain (orally and in writing) the reasoning.
17	8.5.19	Calculate the volume of a cylinder and cone with the same radius and height, and justify (orally and in writing) that the volumes are an upper and lower bound for the volume of a hemisphere of the same radius.
18	8.5.20	Calculate the volume of a sphere, cylinder, and cone.
19	8.5.21	Calculate the value of the radius of a sphere with a given volume using the structure of the equation, and explain (orally) the solution method.

Priority and Category List for Lessons

High priority (+), Medium priority (0), Low priority (-)

E: Explore, Play, and Discuss, D: Deep Dive, A: Synthesize and Apply

Lesson	Priority (+, 0, -)	Category (E, D, A)	Notes
8.5.1	+	E	Describes the relationship between input-output pairs
8.5.2	+	E	Discusses the structure of a function as having one and only one output for each allowable input
8.5.3	+	D	Create and calculate equations that represent a function rule.
8.5.4	+	D	Determine whether a graph represents a function, and explain the reasoning.
8.5.5	0	D	Describe a graph of a function as "increasing" or "decreasing".
8.5.7	0	A	Compare and contrast representations of functions.
8.5.8	+	E	Discusses linear functions can be represented by an equation in the form $y = mx + b$
8.5.9	+	D	Compare and contrast different linear models of the same data.
8.5.10	+	D	Calculate the different rates of change of a piecewise linear function using a graph.
8.5.11	-	E	Create a graph of a function from collected data.
8.5.12	-	E	Estimate the volumes of various containers using different units of measure.
8.5.13	-	D	Calculate the volume of a cylinder.

8.5.14	-	D	Calculate the value of one dimension of a cylinder.
8.5.15	-	D	Calculate the volume of a cone and cylinder given the height and radius.
8.5.16	-	D	Calculate the value of one dimension of a cylinder.
8.5.19	-	E	Calculate the volume of a cylinder and cone with the same radius and height.
8.5.20	-	D	Calculate the volume of a sphere, cylinder, and cone.
8.5.21	-	D	Calculate the value of the radius of a sphere with a given volume using the structure of the equation.
8.5.22	-	A	Compare functions about volume represented in different ways.