Grade 8 Math Unit 5

Canterbury Public Schools

Subject	Math
Grade Level	8
Unit Title	**Functions and Volume**
Unit Goals	1. **Understand Functions**: Define a function as a relationship where each input has exactly one output. 2. **Represent Functions**: Use tables, graphs, and equations to represent functional relationships between two quantities. 3. **Interpret Graphs**: Interpret and label graphs of functions to describe how dependent variables change with independent variables. 4. **Identify Linear Functions:** Recognize and represent linear functions using the form y=mx+b. 5. **Model with Functions:** Use linear functions to model real-world scenarios. 6. **Analyze Function Behavior:** Describe functions as increasing, decreasing, or constant. 7. **Calculate Volume**: Calculate the volumes of cylinders, cones, and spheres. 8. **Understand Formulas:** Understand the structure of volume formulas 9. **Scale and Volume:** Examine how scaling linear dimensions (radius or height) affects the volume of 3D figures.
Pacing (# of weeks)	3 - 4 weeks
Standards	8.F.A.1, 8.F.A.2,8.G.C.9
Content/Conceptual Knowledge (know)	Function rules, volume formulas Function is a relationship between inputs and outputs Different representations of functions (Lesson 3). Features of graphs, equations, and situations (Lesson 4). Features of a situation with features of a graph (Lesson 6). Temperatures shown on a graph with different temperatures given in a table (Lesson 7). The volumes of cones with the volumes of cylinders (Lesson 16). Methods for finding and approximating the volume of a sphere as a function of its radius (Lesson 20).
Skills (be able to do)	Function Concepts ● Identify a function as a rule that assigns exactly one output for each input. ● Distinguish between independent (input) and dependent (output) variables in a context. ● Interpret, compare, and connect functions represented by tables, equations, and graphs. ● Determine if a function is increasing or decreasing over a specific interval.

	Linear Functions ● Analyze Linear Models: Interpret the slope as a rate of change and the y-intercept as an initial value. ● Create equations y=mx+b for linear functions. ● Compare properties of two linear functions represented in different ways (e.g., one in a table, one in a graph). ● Sketch graphs of linear functions, including those with non-positive slopes. Volume ● Compute the volume of cylinders, cones, and spheres using formulas. ● Estimate the volume of 3D objects to solve real-world problems. ● Understand how changes in dimensions (radius/height) affect the volume of cylinders and cones.
Essential Questions	● What is a function, and how do I determine if a relationship is a function? ● How can functions be represented (tables, graphs, equations) and interpreted? ● How do I determine the rate of change and initial value from a linear function? ● How do I compare two different linear functions (e.g., comparing their slopes or intercepts)? ● How do I calculate the volume of cylinders, cones, and spheres? ● How does the volume of a cylinder or cone change when its dimensions (radius or height) are scaled?
Enduring Understandings	A function is a specialized relationship where each allowable input (independent variable) determines exactly one output (dependent variable), which can be represented using tables, graphs, and equations. Functions can be described as increasing or decreasing, and linear functions can be analyzed using their rate of change and slope. Volume indicates the amount of 3D space within an object (cones, cylinders, spheres), and formulas for these shapes are related to the base area and height. When the dimensions of a 3D figure are scaled, the volume changes by the cube of the scale factor, connecting geometry to proportional reasoning.
Vocabulary	Function, volume, input, output, independent variable, dependent variable
Common Learning Experiences	Generalize about what happens to inputs for each rule Generalize about dimensions of cylinders Generalize about the relationship between the volumes of cylinders and cones Generalize about volumes of spheres, cones, and cylinders as functions of their radii Compare representations of functions

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<tr><td></td><td>Compare features of graphs, equations, and situations’
Compare features of a situation with features of a graph
Compare temperatures shown on a graph with different temperatures given in a table
Compare the volumes of cones with the volumes of cylinders

Use methods for finding and approximating the volume of a sphere as a function of its radius</td></tr>
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