

# Measurement and Data

## Domain Overview

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### GRADE 3

The study of measurement in third grade will apply directly to students' daily lives. Students will learn to tell time by the minute, solve story problems with elapsed time, and become proficient in using measurement tools as they work with volume, mass, and weight. Experiences provided at this level will help students formulate questions that can be answered using data. Third graders will also connect multiplication to the area of a rectangle.

### GRADE 4

Fourth graders will focus their learning on understanding the relationship between units within one system of

measurement. Emphasis will be placed on solving problems involving distances, intervals of time, liquid volumes, masses of objects, money, and area and perimeter. Students will also learn to use a protractor to measure angles and will interpret data using line plots they created.

### GRADE 5

Fifth graders will convert like measurement units within a given measurement system and continue to represent and interpret data. In this domain, students will center their learning on geometric measurement with a spotlight on understanding the concept of volume.



## SUGGESTED MATERIALS FOR THIS DOMAIN

3	4	5	
✓	✓	✓	A variety of classroom objects to weigh and/or measure, such as paper clips, pencils, crayons, books, paper, plants, scissors, erasers
✓		✓	A variety of containers to fill, such as cups, beakers, boxes, liters
	✓		Brass fastener and cardboard paper strips (for angles)
✓		✓	Color tiles and color cubes (both cm and inch)
		✓	Dot paper (Reproducible 10)
✓	✓	✓	Geoboards, geobands (rubber bands) (Reproducible 9)
		✓	Grid paper (Reproducible 3)
✓	✓		Individual student clocks to manipulate with both small and big hands
✓	✓	✓	Individual student whiteboards/markers and paper
✓	✓	✓	Measurement tools such as rulers, yardsticks, meter sticks, balances, protractors
✓	✓	✓	Number lines (predetermined/premade) and empty/open number lines
	✓		<i>Spaghetti and Meatballs for All</i> by Marilyn Burns

## KEY VOCABULARY

3	4	5	
✓	✓	✓	<b>analyze data or interpret data</b> process of assigning meaning to the collected information and determining conclusions
	✓		<b>angle</b> a shape, formed by two lines or rays diverging from a point (the vertex)
✓	✓	✓	<b>area</b> the size of a surface
		✓	<b>area of base</b> the bottom of a shape, solid, or three-dimensional object found by multiplying length times width
✓		✓	<b>array</b> an arrangement of objects, pictures, or numbers in columns and rows
✓	✓	✓	<b>attributes</b> characteristic of an object, such as color, size, thickness, or number of sides
✓			<b>bar graph</b> a graph with rectangular bars showing how large each value is. The bars can be horizontal or vertical.
✓			<b>capacity</b> the amount a container can hold when filled
✓	✓	✓	<b>classify</b> categorize

(Continued)

## KEY VOCABULARY

3 4 5

✓	✓	✓	<b>conversion</b> change in the units or form of a measurement, different units, without a change in the size or amount
✓	✓	✓	<b>customary</b> (also called standard) U.S. measurement system for length in inches, feet, yards, and miles; capacity in cups, pints, quarts
✓	✓	✓	<b>data</b> information in numerical form that can be processed
✓	✓		<b>data display</b> a visual of data in graphic form
	✓		<b>decomposing</b> breaking apart
	✓		<b>degree</b> a unit for measuring angles and temperature
	✓		<b>diagram</b> a drawing used to describe
✓	✓	✓	<b>distributive property</b> property stating that multiplying a sum by a number is the same as multiplying each addend by the number and then adding the products
✓	✓		<b>elapsed time</b> the amount of time passed since an event started
✓	✓	✓	<b>estimate</b> roughly determine the size
✓	✓	✓	<b>formula</b> an equation that shows the relationship between variables such as $V = l \times w \times h$
✓		✓	<b>gap/overlap</b> gap = unfilled space; overlap = cover up a part of
✓	✓	✓	<b>gram</b> a metric unit of mass
✓	✓	✓	<b>height</b> a measure of a polygon or solid figure taken as a perpendicular from the base of the figure
✓	✓	✓	<b>inches, foot, centimeter, meter, yards</b> units used to measure length in the customary or measurement system. There are 12 inches in a foot, and 36 inches in a yard. Centimeters and meters are units used to measure length in the metric measurement system. There are 100 centimeters in a meter.
✓	✓		<b>intervals</b> distance between one number and the next on the scale of a graph
✓			<b>key</b> part of a graph used to identify the number of categories present in a graph, also called a legend
✓	✓	✓	<b>kilogram</b> a metric measure of mass
✓	✓	✓	<b>length</b> the distance from end to end
✓	✓	✓	<b>line plot</b> a number line with an x placed above the corresponding value on the line for each piece of data
✓	✓	✓	<b>liter</b> a metric unit of volume, usually to measure liquid
✓	✓	✓	<b>mass/weight</b> a measure of how much matter is in an object

# KEY VOCABULARY

3 4 5

✓	✓	✓	<b>metric system</b> measurement system that measures length in millimeters, centimeters, meters, and kilometers; capacity in liters and milliliters; mass in grams and kilograms; and temperature in degrees Celsius
✓	✓	✓	<b>number line</b> a model or representation with whole counting numbers or fractions, used to show the position of a number in relation to zero and other numbers
✓	✓	✓	<b>perimeter</b> distance around a figure or object
✓			<b>picture graph</b> a type of graph using pictures to represent data
✓	✓	✓	<b>plane figure</b> two-dimensional shapes
✓			<b>point</b> an exact position or location on a plane surface
	✓		<b>protractor</b> tool for measuring angles
✓	✓	✓	<b>polygon</b> many-sided shape whose sides are the same length and interior angles are the same measure
	✓		<b>ray</b> a line that starts at a point and goes off in a particular direction to infinity
	✓		<b>rectangular prism</b> a solid (three-dimensional) object that has six rectangular faces and the same cross-section along a length, which makes it a prism
✓			<b>rectilinear</b> a figure whose edges meet at right angles
✓			<b>scale (graphs)</b> the horizontal scale across the bottom and the vertical scale along the side of a graph that tell how much/many
		✓	<b>solid figure</b> a three-dimensional object with depth, width, and height
✓	✓	✓	<b>square unit</b> the area of a square whose sides measures 1 unit used to measure area
✓	✓	✓	<b>standard</b> (also called customary measurement) U.S. measurement system of length in inches, feet, yards, and miles; capacity in cups, pints, quarts
		✓	<b>three-dimensional figures</b> figures with three dimensions: length, width, and height
✓		✓	<b>tiling</b> a collection of subsets of the plane, that is, tiles that cover the plane without gaps or overlaps
✓	✓	✓	<b>two-dimensional figures</b> figures with two dimensions: length and width
✓	✓		<b>vertex</b> the common endpoint of two or more rays or line segments
✓		✓	<b>volume</b> the measure of the amount of space inside of a solid figure, like a cube, ball, cylinder, or pyramid, measured with cubic units
✓	✓	✓	<b>weight</b> the total number of substance present in an object. Customary and metric units can be used to calculate the mass (weight).