Grades K-6 Measurement & Data and Statistics & Probability Coherence Card Sort

Grades K-6 Measurement & Data and Statistics & Probability Standards	Grades K-6 Measurement & Data and Statistics & Probability Standards
Relate area to the operations of multiplication and addition. a. Find the area of a rectangle with whole-number side lengths by tiling it and show that the area is the same as would be found by multiplying the side lengths. b. Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real world and mathematical problems and represent whole-number products as rectangular areas in mathematical reasoning. c. Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and $b + c$ is the sum of $a \times b$ and $a \times c$. Use area models to represent the distributive property in mathematical reasoning. d. Recognize area as additive. Find areas of figures that can be decomposed into non-overlapping rectangles by adding the areas of the non-overlapping parts, applying this technique to solve real world problems.	Investigate questions involving numerical data. a. Identify a statistical question focused on numerical data; b. Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. c. Show the data by making a dot plot where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters. d. Make observations from the graph about the question posed, including questions about the shape of the data and that compare responses.

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Investigate questions involving categorical data. a. Pose a question that can be answered by gathering data. b. Determine a strategy for gathering data from peers. c. Organize and represent data in a table/chart with up to three categories. d. Interpret data to answer questions about the table/chart that connects to the question posed, including total number of data points, how many in each category, and how many more or less are in one category than in another.	Investigate questions involving measurements. a. Identify a statistical question focused on measurements. b. Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. c. Show the measurements by making a dot plot, where the horizontal scale is marked off in whole-number units.
Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume. a. Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes. b. Apply the formulas $V = l \times w \times h$ and $V = B \times h$ for rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems. c. Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.	Summarize numerical data sets in relation to their context, such as by: a. Reporting the number of observations. b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement. c. Determining quantitative measures of center (median and/or mean) a distribution of numerical data. d. Describing distributions of numerical data qualitatively relating to shape (using terms such as cluster, mode(s), gap, symmetric, skewed-left, skewed-right, and the presence of outliers) and quantitatively relating to spread/variability (using terms such as range and interquartile range). e. Relating the choice of measures of center and variability to the shape of the data distribution.

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Know relative size of measurement units (mass, weight, liquid volume, length, time) within one system of units (metric system, U.S. standard system and time) a. Understand the relationship of measurement units within any given measurement system. b. Within any given measurement system, express measurements in a larger unit in terms of a smaller unit. c. Record measurement equivalents in a two-column table.	Solve real world and mathematical problems involving perimeters of polygons. a. Find the perimeter given the side lengths of a polygon. b. Find an unknown side length, given the perimeter and some lengths. c. Draw rectangles with the same perimeter and different areas or with the same area and different perimeters.
Use dot plots to analyze data to a statistical question. a. Identify a statistical question focused on numerical data. b. Make a dot plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). c. Solve problems involving addition and subtraction of fractions by using information presented in line plots.	Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money. a. Solve measurement problems involving whole numbers, simple fractions, or decimals. b. Solve problems that require converting a given measurement from a larger unit to a smaller unit with a common measurement system, such as 2km = 2,000m c. Visually display measurement quantities using representations such as number lines that feature a measurement scale.

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Investigate questions involving categorical data. a. Identify a statistical question focused on categorical data and gather data; b. Create a scaled pictograph and a scaled bar graph to represent a data set (using technology or by hand); c. Make observations from the graph about the question posed, including “how many more” and “how many less” questions.	Apply the four-step investigative process for statistical reasoning. a. Formulate Questions: Formulate a statistical question as one that anticipates variability and can be answered with data. b. Collect Data: Design and use a plan to collect appropriate data to answer a statistical question. c. Analyze Data: Select appropriate graphical methods and numerical measures to analyze data by displaying variability within a group, comparing individual to individual, and comparing individual to group. d. Interpret Results: Draw logical conclusions and make generalizations from the data based on the original question.
Measure to determine how much longer one object is than another, expressing the length difference in terms of either a customary or metric standard length unit.	Create a pictograph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put together, take-apart, and compare problems using information presented in a bar graph.

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Recognize volume as an attribute of solid figures and understand concepts of volume measurement. a. A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume. b. A solid figure which can be packed without gaps or overlaps using *n* unit cubes is said to have a volume of *n* cubic units.	Assign values to time and money. a. Tell and write time in hours and half-hours using analog and digital clocks. b. Identify the coins by their values (penny, nickel, dime, quarter).
Recognize that a measure of center for a numerical data set summarizes all of its values with a single number to describe a typical value, while a measure of variation describes how its values in the distribution vary.	Measure and solve problems involving mass and liquid volume. a. Measure and estimate masses and liquid volumes of objects using standard units of grams (g), kilograms (kg), and liters (L). b. Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units.

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Order three objects by length; compare the lengths of two objects indirectly by using a third object.	Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft and improvised units.
Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.	Solve word problems with adding and subtracting within 100, (not using dollars and cents simultaneously) using the $ and ¢ symbols appropriately (not including decimal notation).

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Classify and sort objects or people by attributes. Limit objects or people in each category to be less than or equal to 10.	Recognize and identify coins by name (penny, nickel, dime, quarter).
Recognize area as an attribute of plane figures and understand concepts of area measurement.	Apply the area and perimeter formulas for rectangles in real world and mathematical problems.

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Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).	Tell and write time to the nearest minute and measure elapsed time intervals in minutes. Solve word problems involving addition and subtraction of time intervals within and across the hour in minutes.
Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.	Express the length of an object as a whole number of same-size length units, by laying multiple copies of a shorter object (the length unit) end to end with no gaps or overlaps.

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Estimate lengths using units of inches, feet, yards, centimeters, and meters.	Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.
Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units by using drawings and equations with a symbol for the unknown number to represent the problem.	Represent whole numbers as lengths from 0 on a number line with equally spaced points corresponding to the numbers 0, 1, 2, ..., and represent whole-number sums and differences within 100 on a number line.

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Describe measurable attributes (length, height, weight, width, depth) of an object or a set of objects using appropriate vocabulary.	Directly compare two objects with a measurable attribute in common, to see which object has “more of”/“less of” the attribute and describe the difference.
Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems.	Convert among different size measurement units (mass, weight, liquid volume, length, time) within one system of units (metric system, U.S. standard system and time).

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Identify and gather data for statistical questions focused on both categorical and numerical data. Select an appropriate data display (bar graph, pictograph, dot plot). Make observations from the graph about the questions posed.	Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint and understand concepts of angle measurement.
Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers.	Understand that a set of numerical data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.

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Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.	Display the distribution of numerical data in plots on a number line, including dot plots, histograms and box plots.