Statistics and Probability

Domain Overview

GRADE 6

A major focus for sixth graders is to develop an understanding of statistical thinking. Students study measures of center and variability with newly learned knowledge of mean, median, mode, and range. Using dot plots, histograms, and box plots, students draw inferences and make comparisons between data sets. At this level, students recognize that a data distribution may not have a definite center and that different ways to measure center provide different values. Students discover that interpreting different measures of center for the same data develops the understanding of how each measure can change how data get interpreted.

GRADE 7

In seventh grade, students learn that statistics can be used to gain information about a population by examining a sample of the population. They draw inferences about a population and also draw informal comparative inferences about two populations. Seventh graders investigate and learn that the probability of a chance event is a number between 0 and 1. They develop a probability model and use it to find probabilities of events.

GRADE 8

The study of statistics in eighth grade focuses on constructing and interpreting scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Students describe these patterns as clusters, outliers, positive or negative association, and linear or nonlinear association. Eighth graders learn that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table.

SUGGESTED MATERIALS FOR THIS DOMAIN

6	7	8	
	✓		Bags of colored marbles
	✓		Coins or two-sided counters
	✓		Dice or number cubes
	✓	✓	Graphing calculators
✓	✓	✓	Graph paper (large chart size and individual size)
	✓		Spinners

KEY VOCABULARY

6	7	8	
		✓	**bivariate data** data in two variables, one to be graphed on the *x*-axis and the other on the *y*-axis
✓			**box plot** a visual graphical display to show the median, quartiles, and extremes of a data set on a number line and the distribution of the data
✓		✓	**categorical data** data that can be sorted in groups or categories such as hair color, shoe size, and so on
	✓		**certain event** event with a probability of 1 on a scale from 0 to 1
	✓		**compound event** event in a sample space that has been constructed from two other sample spaces (sample space for tossing a coin and sample space for rolling a die)
✓	✓	✓	**data** descriptive facts or numbers
✓			**dot plot** a graphical number line display of data using dots
	✓		**event** a set of outcomes
	✓	✓	**frequency** the number of times a number or event occurs in a set of data
✓			**histogram** a visual graph that displays frequency of continuous data using bars. A histogram usually groups the data in ranges with no space between the bars.
✓	✓		**interquartile range** measure of variability; the difference between the first quartile and third quartile of a set of data. It is a way to describe the spread of a set of data or how the data are scattered.
	✓		**likelihood** how likely, unlikely, equally likely, certain, or impossible an event is to occur
	✓		**likely** an event that is likely has a probability approaching 1

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KEY VOCABULARY

6	7	8	
✓	✓	✓	**mean** the sum of the numbers in a set of data divided by the number of pieces of data; usually called "average"; arithmetic mean
✓	✓		**mean absolute deviation** the mean of the absolute deviations from the mean of each point in the data set
✓	✓		**measures of center** numerical values used to describe the overall clustering of data in a set; the overall "average" of a set of data. Three measures of central tendency are mean, median, and mode.
✓	✓		**measures of variation** range, interquartile range
✓	✓		**median** the number in the middle of a set of data when the data are arranged in order. When there are two middle numbers, the median is their mean.
	✓		**outcome** an element in the sample space
		✓	**outlier** a number in a data set that is significantly smaller or larger than the other number
	✓		**population** the entire set from which data can be selected
	✓		**probability** the measure of the likelihood of an event
	✓		**random sample** a sample chosen from a population in which each data in the population has an equal chance of being chosen
✓	✓		**sample** a selection from a population
✓	✓		**sample space** the set of all possible outcomes for a probability experiment. Sample spaces can be displayed as diagrams, lists, and tables.
	✓	✓	**scatter plot** the graph of a collection of ordered pairs
	✓		**simulation** an experiment that models a real-life situation; often done with technology
✓	✓	✓	**statistics** the collection, organization, and analysis of data
✓		✓	**statistical question** a question that anticipates variability in the data
	✓		**survey data** information (numerical or categorical) collected by asking questions of members of a population
	✓		**unlikely** an event that is unlikely has a probability approaching 0
✓	✓	✓	**variability** measure of spread. A measure of spread tells us how much a data sample is spread out or scattered.