

Standard 4: Data Benchmark 1: Probability

Organizer	Indicator lead-in phrase/wording	Kindergarten	First Grade	Second Grade	Third Grade	Fourth Grade	Fifth Grade	Sixth Grade	Seventh Grade	Eighth Grade	Ninth and Tenth Grade
<b>Probability</b>	<b>recognizes, states, and/or lists...</b>	K.1...whether an event is impossible or possible	K.1...certain for simple event	K.1...likely, or unlikely for simple event	K.1...equally likely for simple event	K.1...that the probability of an impossible event is zero and that the probability of a certain event is one	K.1...that all probabilities range from zero (impossible) through one	K.3...whether an outcome in a compound event in an experiment or simulation is impossible, certain, likely, unlikely, or equally likely		K.1...the difference between independent and dependent events in an experiment, simulation, or situation	
	<b>recognizes, states, and/or lists...</b>	K.2...whether a simple event in an experiment or simulation including the use of concrete objects can have more than one outcome	K.2...whether a simple event in an experiment or simulation including the use of concrete objects can have more than one outcome	K.2...some of the possible outcomes of a simple event in an experiment or simulation including the use of concrete objects	▲K.2...some of the possible outcomes of a simple event in an experiment or simulation including the use of concrete objects	K.2...all possible outcomes of a simple event in an experiment or simulation including the use of concrete objects	K.2...all possible outcomes of a simple event in an experiment or simulation including the use of concrete objects	▲K.2...all possible outcomes of an experiment or simulation with a compound event composed of two independent events in a clear and organized way			
	<b>recognizes, finds, states, uses, and/or represents...</b>					K.3...the probability of a simple event in an experiment or simulation	K.3 & K.4...the probability of a simple event in an experiment or simulation with representation of range from 0 through 1 with probability as a fraction when appropriate when all probabilities are equally likely	K.1 & ▲K.4...that all probabilities range from 0 through 1 and can be written as a fraction, decimal, or a percent	K.1, K.3, & K.4...the probability of a compound event composed of two independent events in an experiment or simulation as a fraction, decimal, and percent with possible geometric models	▲K.3, K.4, & K.5...add odds expressed as a ratio	K.1 & K.2...the probability of two independent events and conditional probability of two dependent events in an experiment, simulation, or situation
	<b>explains, gives, and/or identifies...</b>								K.2...examples of simple or compound events in an experiment or simulation having probability of zero or one	K.2 & K.6...situations with independent or dependent events in an experiment, simulation, or situation and the difference between probability and odds	▲K.3...the relationship between probability and odds and computes one given the other

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Probability	<b>makes prediction and/or conducts...</b>	A.1...an experiment or simulation with a simple event and records the results in a graph using concrete objects or frequency tables (tally marks)	A.1...about a simple event in an experiment or simulation, conducts the experiment or simulation, and records the results in a graph using concrete objects, a pictograph with a symbol or picture representing only one, or a bar graph	A.1...add conducts the experiment or simulation including the use of concrete objects; records the results in a chart, table, or graph; and makes an accurate statement about the results	A.1...add uses the results to draw conclusions about the event	A.1...add uses the results to draw conclusions about the event	A.1...add makes predictions about future events	A.1...an experiment or simulation with a compound event composed of two independent events including the use of concrete objects; records the results in a chart, table, or graph; and uses the results to draw conclusions about the events and make predictions about future events	A.1...an experiment or simulation with a compound event composed of two independent events including the use of concrete objects; records the results in a chart, table, or graph; and uses the results to draw conclusions about the events and make predictions about future events	A.1...an experiment or simulation with independent or dependent events including the use of concrete objects; records the results in a chart, table, or graph; and uses the results to draw conclusions and make predictions about future events	A.1...an experiment or simulation with two dependent events; records the results in charts, tables, or graphs; and uses the results to generate convincing arguments, draw conclusions and make predictions
	<b>compares...</b>				A.2...what should happen (theoretical probability/expected results) with what did happen (experimental probability/empirical results) in an experiment or simulation with a simple event	A.3...what should happen (theoretical probability/expected results) with what did happen (experimental probability/experimental results) in an experiment or simulation with a simple event	A.3...what should happen (theoretical probability/expected results) with what did happen (experimental probability/empirical results) in an experiment or simulation with a simple event	A.3...add with a compound event composed of two independent events	A.3...add with a compound event composed of two simple independent events and understands that the larger the sample size, the greater the likelihood that the experimental results will equal the theoretical probability	A.3...add with a compound event composed of two simple independent events and understands that the larger the sample size, the greater the likelihood that the experimental results will equal the theoretical probability	A.3...add two independent and/or dependent events and understands that the larger the sample size, the greater the likelihood that experimental results will match theoretical probability
	<b>uses or analyzes...</b>					A.2...the results from a completed experiment or simulation of a simple event to make predictions in a variety of real-world problems	A.2...the results from a completed experiment or simulation of a simple event to make predictions in a variety of real-world problems	A.2...add of a compound event composed of two independent events to draw conclusions and make predictions in a variety of real-world situations	A.2...add generate convincing arguments, and make predictions and decisions in a variety of real-world situations	A.2...add of two independent events to generate convincing arguments, draw conclusions, and make predictions and decisions in a variety of real-world situations	A.2...add including: work in economics, quality control, genetics, meteorology, other areas of science, games, including situations involving geometric models

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Probability	makes predictions or uses...								A.4...based on the theoretical probability of a simple event in an experiment or simulation	▲A.4...add compound events composed of two independent events in an experiment or simulation	A.4...conditional probabilities of two dependent events in an experiment, simulation, or situation to make predictions and analyze decisions

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<b>Representing Data</b>	<b>records, organizes, displays, and reads numerical and non-numerical data including...</b>	K.1...concrete objects, graphs, and tables using these data displays: graphs using concrete objects, pictographs with a whole symbol or picture representing one, and frequency tables	K.1 & K.5...add data in a clear, organized, and accurate manner including a title, labels, and whole number intervals using these data displays: graphs using concrete objects, : pictographs with a whole symbol or picture representing one, horizontal and vertical bar graphs, and Venn diagrams or other pictorial displays using one attribute	K.1...add with categories, and whole number intervals using these data displays: graphs using concrete objects.; pictographs with a whole symbol or picture representing one, two, or ten, frequency tables, horizontal and vertical bar graphs, Venn diagrams or other pictorial displays, and line plots	K.1...add pictographs with a whole symbol or picture representing one, two, five, ten, twenty-five, or one hundred, frequency tables, horizontal and vertical bar graphs, Venn diagrams or other pictorial displays, line plots, and charts and tables	▲K.1...add pictographs with a symbol or picture representing one, two, five, ten, twenty-five, or one hundred including partial symbols when the symbol represents an even amount, frequency tables, horizontal and vertical bar graphs, Venn diagrams or other pictorial displays, line plots, charts and tables, and line and circle graphs	K.1...add whole number and decimal intervals using these data displays: pictographs, frequency tables, horizontal and vertical bar graphs, Venn diagrams or other pictorial displays, line plots, charts and tables, line and circle graphs, and single stem-and-leaf plots	K.1...add rational number intervals using these data displays: graphs using concrete objects, frequency tables and line plots, bar, line, and circle graphs, Venn diagrams and other pictorial displays, charts and tables, single stem-and-leaf plots, and scatter plots	▲K.1...add box-and-whiskers plots	K.1...add stem-and-leaf plots (single and double), and histograms	K.1...add stem-and-leaf plots (single and double), and histograms
	<b>communicates, interprets, answers, and/or uses the results of data collection...</b>	A.1...from graphs using concrete objects and frequency tables	A.1...questions based on information from: graphs using concrete objects, pictographs, frequency tables, and horizontal or vertical bar graphs	A.1...questions based on information from: graphs using concrete objects, pictographs, frequency tables, and horizontal or vertical bar graphs	A.1...questions based on information from: graphs using concrete objects, pictographs, frequency tables, horizontal or vertical bar graphs, Venn diagrams, line plots, and charts and tables	A.1...questions based on information from: graphs using concrete objects, pictographs, frequency tables, horizontal or vertical bar graphs, Venn diagrams, line plots, charts and tables, and line graphs	▲A.1...questions based on information from: graphs using concrete objects, pictographs, frequency tables, bar and line graphs, Venn diagrams, line plots, charts and tables, and circle graphs	A.1...questions based on information from: graphs using concrete objects, frequency tables, and line plots, bar, line, and circle graphs, Venn diagrams, charts and tables, stem-and-leaf plots, scatter plots, and box-and-whisker plots	A.1...questions based on information from: frequency tables, bar, line, and circle graphs, Venn diagrams, charts and tables, stem-and-leaf plots, scatter plots, and box-and-whisker plots	A.1...questions based on information from: frequency tables, bar, line, and circle graphs, Venn diagrams, charts and tables, stem-and-leaf plots, scatter plots, box-and-whisker plots, and histogram	▲A.1...questions based on information from: frequency tables, bar, line, and circle graphs, Venn diagrams, charts and tables, stem-and-leaf plots, scatter plots, box-and-whisker plots, and histogram
	<b>selects, collects, justifies, recognizes, and describes...</b>	K.2...data related to familiar everyday experiences by counting and tallying	K.2...add using different techniques: observations or interviews and explains the results	K.2...add surveys and explains the results	K.2...add polls and explains the results	K.2...add random sampling and explains the results	K.2...add random sampling and explains the results	K.2 & K.3...add using sampling to collect and describe the results	K.2 & K.3...add using sampling to collect and describe the results	K.2...valid and invalid data collection and sampling techniques	K.2...how the reader's bias, measurement errors, and display distortions can affect the interpretation of data
	<b>determines...</b>		A.2...categories from which data could be gathered	A.2...categories from which data could be gathered							

Standard 4: Data Benchmark 2: Statistics

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Representing Data	recognizes/ explains/ determines and describes ...			A.3...that the same data set can be displayed in various formats	A.3...that the same data set can be displayed in various formats	A.3...that the same data set can be displayed in various formats	A.3...that the same data set can be displayed in various formats and discusses why a particular format may be more appropriate than another	A.2...advantages and disadvantages of various data displays	A.2...advantages and disadvantages of various data displays	A.2...advantages and disadvantages of various data collection techniques, and sampling techniques in a given situation	A.2...data collection techniques, and sampling techniques in a given situation
	finds, identifies, determines, calculates, and/or explains...	K.3...the mode after sorting by one attribute	K.3 & K.4...add identifies the minimum and maximum values in a data set	K.3, K.4, & K.5...add mode for a data set using concrete objects that include: quantitative/numerical data (whole numbers through 100), qualitative/non-numerical data (category that occurs most often), and the range for a data set using two-digit whole numbers	▲K.3...these statistical measures of a data set with less than ten data points using whole numbers from 0 through 1,000: minimum and maximum data values, range, mode, and median when data set has an odd number of data points	K.3...add mean when data set has a whole number mean	▲K.3...add median (including answers expressed as a decimal or a fraction without reducing to simplest form) and mean (including answers expressed as a decimal or a fraction without reducing to simplest form)	K.4...mean, median, mode, and range for: a decimal data set with decimals greater than or equal to zero	K.4, K.5, & K.6...the measures of central tendency (mode, median, mean), the range and the quartiles, and potential outliers for a rational number data set,	▲K.3 & K.4...add interquartile range for a rational number data set	K.3...the meaning of range, quartiles and interquartile range for a real number data set
Statistics	uses these statistical measures to make reasonable inferences and predictions, answer questions, and make decisions...				A.2...with a data set of less than ten data points, whole numbers from 0 through 1,000: minimum and maximum data values, range, mode, and median given an odd number of data points	▲A.2...with a data set of less than ten data points, whole numbers from 0 through 1,000: minimum and maximum data values, range, mode, median given an odd number of data points, and a whole number mean	A.2...with a whole numbers a data set: minimum and maximum data values, range, mode, median, and a whole number mean				A.5...analyzes the effects of: outliers on the mean, median, and range of a real number data set and/or changes within a real number data set on mean, median, mode, range, quartiles, and interquartile range
	explains...									K.5...the effects of outliers on the median, mean, and range of a rational number data set	▲K.4...add mode and interquartile range of a real number data set

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<b>Statistics</b>	<b>makes, approximates, and/or analyzes...</b>									K.6...a scatter plot and draws a line that approximately represents the data, determines whether a correlation exists, and if that correlation is positive, negative, or that no correlation exists	▲ K.5 & K.6...a line of best fit given a scatter plot and makes predictions using the equation of that line and decisions using the equation of that line
	<b>compares and contrasts...</b>										K.6...the dispersion of two given sets of data in terms of range and the shape of the distribution including: symmetrical, skew, bimodal, and uniform
	<b>recognizes/explains/uses ...</b>					A.4...the effects of scale and interval changes on graphs of whole number data sets	A.4...the effects of scale and interval changes on graphs of whole number data sets	A.3...the effects of scale and/or interval changes on graphs of whole number data sets	▲ A.3...misleading representations of data and/or the effects of scale or interval changes on graphs of data sets	A.3...misleading representations of data and/or the effects of scale or interval changes on graphs of data sets	A.3...changes in scales, intervals, and categories to help support a particular interpretation of the data
	<b>determines and explains ...</b>								A.4...the advantages and disadvantages of using each measure of central tendency and the range to describe a data set	A.4...recognizes faulty arguments and common errors in data analysis	A.4...the advantages and disadvantages of using each measure of central tendency and the range to describe a data set