

Mathematics: New York State Core Curriculum: Statistics and Probability Strand
Performance Indicators Organized by Grade Level and Band under Major Understandings

Students will collect, organize, display, and analyze data..	
PK.S.1 Organ/Display	Sort and organize objects by one attribute (e.g., color, size, or shape).
PK.S.2 Organ/Display	Use physical objects to make graphs.
PK.S.3 Analysis	Count and compare groups formed (quantify groups formed).
PK.S.4 Analysis	Describe the attributes of objects.
K.S.1 Collect	Gather data in response to questions posed by the teacher and students.
K.S.2 Organ/Display	Help to make simple pictographs for quantities up to 10, where one picture represents 1.
K.S.3 Organ/Display	Sort and organize objects by two attributes (e.g., color, size, or shape).
K.S.4 Organ/Display	Represent data using manipulatives.
K.S.5 Analysis	Identify more, less, and same amounts from pictographs or concrete models.
1.S.1 Collect	Pose questions about themselves and their surroundings.
1.S.2 Collect	Collect and record data related to a question.
1.S.3 Organ/Display	Display data in simple pictographs for quantities up to 20 with units of one.
1.S.4 Organ/Display	Display data in bar graphs using concrete objects with intervals of one.
1.S.5 Organ/Display	Use Venn diagrams to sort and describe data.
1.S.6 Analysis	Interpret data in terms of the words: most, least, greater than, less than, or equal to.
1.S.7 Analysis	Answer simple questions related to data displayed in pictographs (e.g., category with most, how many more in a category compared to another, how many all together in two categories).
2.S.1 Collect	Formulate questions about themselves and their surroundings.
2.S.2 Collect	Collect and record data (using tallies) related to the question.
2.S.3 Organ/Display	Display data in pictographs and bar graphs using concrete objects or a representation of the object.
2.S.4 Analysis	Compare and interpret data in terms of describing quantity (similarity or differences).
3.S.1 Collect	Formulate questions about themselves and their surroundings.
3.S.2 Collect	Collect data using observation and surveys, and record appropriately.
3.S.3 Organ/Display	Construct a frequency table to represent a collection of data.
3.S.4 Organ/Display	Identify the parts of pictographs and bar graphs.
3.S.5 Organ/Display	Display data in pictographs and bar graphs.
3.S.6 Organ/Display	State the relationships between pictographs and bar graphs.
3.S.7 Analysis	Read and interpret data in bar graphs and pictographs.
4.S.1 Collect	Design investigations to address a question from given data.
4.S.2 Collect	Collect data using observations, surveys, and experiments and record appropriately.
4.S.3 Organ/Display	Represent data using tables, bar graphs, and pictographs.
4.S.4 Analysis	Read and interpret line graphs.
5.S.1 Collect	Collect and record data from a variety of sources (e.g., newspapers, magazines, polls, charts, and surveys).
5.S.2 Organ/Display	Display data in a line graph to show an increase or decrease over time.
5.S.3 Analysis	Calculate the mean for a given set of data and use to describe a set of data.



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6.S.1 Collect	Develop the concept of sampling when collecting data from a population and decide the best method to collect data for a particular question.
6.S.2 Organ/Display	Record data in a frequency table..
6.S.3 Organ/Display	Construct Venn diagrams to sort data.
6.S.4 Organ/Display	Determine and justify the most appropriate graph to display a given set of data (pictograph, bar graph, line graph, histogram, or circle graph).
6.S.5 Analysis	Determine the mean, mode and median for a given set of data.
6.S.6 Analysis	Determine the range for a given set of data.
6.S.7 Analysis	Read and interpret graphs.
7.S.1 Collect	Identify and collect data using a variety of methods.
7.S.2 Organ/Display	Display data in a circle graph.
7.S.3 Organ/Display	Convert raw data into double bar graphs and double line graphs.
7.S.4 Analysis	Calculate the range for a given set of data.
7.S.5 Analysis	Select the appropriate measure of central tendency.
7.S.6 Analysis	Read and interpret data represented graphically (pictograph, bar graph, histogram, line graph, double line/bar graphs or circle graph).
A.S.1 Organ/Display	Categorize data as qualitative or quantitative.
A.S.2 Organ/Display	Determine whether the data to be analyzed is univariate or bivariate.
A.S.3 Organ/Display	Determine when collected data or display of data may be biased.
A.S.4 Organ/Display	Compare and contrast the appropriateness of different measures of central tendency for a given data set.
A.S.5 Organ/Display	Construct a histogram, cumulative frequency histogram, and a box-and-whisker plot, given a set of data.
A.S.6 Organ/Display	Understand how the five statistical summary (minimum, maximum, and the three quartiles) is used to construct a box-and-whisker plot.
A.S.7 Organ/Display	Create a scatter plot of bivariate data.
A.S.8 Organ/Display	Construct manually a reasonable line of best fit for a scatter plot and determine the equation of that line.
A.S.9 Analysis	Analyze and interpret a frequency distribution table or histogram, a cumulative frequency distribution table or histogram, or a box-and-whisker plot.
A.S.10 Analysis	Evaluate published reports and graphs that are based on data by considering: experimental design, appropriateness of the data analysis, and the soundness of the conclusions.
A.S.11 Analysis	Find the percentile rank of an item in a data set and identify the point values for first, second, and third quartiles.
A.S.12 Analysis	Identify the relationship between the independent and dependent variables from a scatter plot (positive, negative, or none).
A.S.13 Analysis	Understand the difference between correlation and causation.
A.S.14 Analysis	Identify variables that might have a correlation but not a causal relationship.
A2.S.1 Collect	Understand the differences among various kinds of studies (e.g., survey, observation, controlled experiment).
A2.S.2 Collect	Determine factors which may affect the outcome of a survey.
A2.S.3 Organ/Display	Calculate measures of central tendency with group frequency distributions.
A2.S.4 Organ/Display	Calculate measures of dispersion (range, quartiles, interquartile range, standard deviation, variance) for both samples and populations.
A2.S.5 Organ/Display	Know and apply the characteristics of the normal distribution.



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Students will make predictions that are based upon data analysis.	
1.S.8 Prediction	Discuss conclusions and make predictions in terms of the words likely and unlikely.
1.S.9 Prediction	Construct a question that can be answered by using information from a graph.
2.S.5 Prediction	Discuss conclusions and make predictions from graphs.
3.S.8 Prediction	Formulate conclusions and make predictions from graphs.
4.S.5 Prediction	Develop and make predictions that are based on data.
4.S.6 Prediction	Formulate conclusions and make predictions from graphs.
5.S.4 Prediction	Formulate conclusions and make predictions from graphs.
6.S.8 Prediction	Justify predictions made from data.
7.S.7 Prediction	Identify and explain misleading statistics and graphs.
A.S.15 Prediction	Identify and describe sources of bias and its effect, drawing conclusions from data.
A.S.16 Prediction	Recognize how linear transformations of one-variable data affect the data's mean, median, mode, and range.
A.S.17 Prediction	Use a reasonable line of best fit to make a prediction involving interpolation or extrapolation.
A2.S.6 Prediction	Determine from a scatter plot whether a linear, logarithmic, exponential, or power regression model is most appropriate.
A2.S.7 Prediction	Determine the function for the regression model, using appropriate technology, and use the regression function to interpolate and extrapolate from the data.
A2.S.8 Prediction	Interpret within the linear regression model the value of the correlation coefficient as a measure of the strength of the relationship.



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Students will understand and apply concepts of probability.	
5.S.5 Probability	List the possible outcomes for a single-event experiment.
5.S.6 Probability	Record experiment results using fractions/ratios.
5.S.7 Probability	Create a sample space and determine the probability of a single event, given a simple experiment (e.g., rolling a number cube).
6.S.9 Probability	List possible outcomes for compound events.
6.S.10 Probability	Determine the probability of dependent events.
6.S.11 Probability	Determine the number of possible outcomes for a compound event by using the fundamental counting principle and use this to determine the probabilities of events when the outcomes have equal probability.
7.S.8 Probability	Interpret data to provide the basis for predictions and to establish experimental probabilities.
7.S.9 Probability	Determine the validity of sampling methods to predict outcomes.
7.S.10 Probability	Predict the outcome of an experiment.
7.S.11 Probability	Design and conduct an experiment to test predictions.
7.S.12 Probability	Compare actual results to predicted results.
A.S.18 Analysis	Know the definition of conditional probability and use it to solve for probabilities in finite sample spaces.
A.S.19 Analysis	Determine the number of elements in a sample space and the number of favorable events.
A.S.20 Analysis	Calculate the probability of an event and its complement.
A.S.21 Analysis	Determine empirical probabilities based on specific sample data.
A.S.22 Analysis	Determine, based on calculated probability of a set of events, if: <ul style="list-style-type: none"> ▪ some or all are equally likely to occur ▪ one is more likely to occur than another ▪ whether or not an event is certain to happen or not to happen.
A.S.23 Analysis	Calculate the probability of: <ul style="list-style-type: none"> ▪ a series of independent events ▪ a series of dependent events ▪ two mutually exclusive events ▪ two events that are not mutually exclusive.
A2.S.9 Probability	Differentiate between situations requiring permutations and those requiring combinations.
A2.S.10 Probability	Calculate the number of possible permutations (${}_nP_r$) of n items taken r at a time.
A2.S.11 Probability	Calculate the number of possible combinations (${}_nC_r$) of n items taken r at a time.
A2.S.12 Probability	Use permutations, combinations, and the Fundamental Principle of Counting to determine the number of elements in a sample space and a specific subset (event).
A2.S.13 Probability	Calculate theoretical probabilities, including geometric applications.
A2.S.14 Probability	Calculate empirical probabilities.
A2.S.15 Probability	Know and apply the binomial probability formula to events involving the terms <i>exactly</i> , <i>at least</i> , and <i>at most</i> .
A2.S.16 Probability	Use the normal distribution as an approximation for binomial probabilities.

