SD Common Core State Standards Disaggregated Math Template

Domain:	Statistics and Probability	**Cluster:**	Use random sampling to draw inferences about a population	**Grade level:**	7

Correlating Standard in Previous Year	Number Sequence & Standard	Correlating Standard in Following Year
6.SP.1 Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. *For example, "How old am I?" is not a statistical question, but "How old are the students in my school?" is a statistical question because one anticipates variability in students' ages.*	7.SP.1 Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.	Terminating Standard

Student Friendly Language:

I can identify a random sample.
I can make conclusions about a population by examining a sample.

Know (Factual)	**Understand (Conceptual) The students will understand that:**	**Do (Procedural, Application, Extended Thinking)**
• A sample is part of a larger population. • Random Sample • Representative Sample	One can make generalizations about a population based on data collected from a sample of a population. Generalizations about a population from a sample are valid only if the sample is representative of that population. Random sampling tends to produce representative samples and support valid inferences.	Make generalizations about a population based on data collected from a sample. Explain whether or not a sample is representative of the entire population and why.

Key Vocabulary:

sample population random sample representative sample generalizations sampling
inferences statistics probability survey biased questions,

Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question "why do I have to learn this"?

Use the result of a survey or past actions to predict the actions of a larger group.

Collecting data about grasshoppers in a small area, such as male/female or size, in order to make generalizations about the grasshoppers in a yard or field.

Students will divide a sheet of graph paper into 20 equal squares. They will pour a cup of rice (to represent grasshoppers) onto the graph paper, making sure not to go off the grid. Students will select four squares as their population sample. Then students will take an average of the four squares they selected by adding the four squares and dividing by four. Students will then find an estimated population of grasshoppers by multiplying the average number of grasshoppers per square by the total number of squares.

Write a survey question to be given to community members (EX. "What day should school start?"). Determine how to collect a representative sample of the community. Conduct the survey and make generalizations about the community.

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6.SP.1 Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. *For example, "How old am I?" is not a statistical question, but "How old are the students in my school?" is a statistical question because one anticipates variability in students' ages.* 6.SP.2 Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape. 6.SP.3 Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number. 6.SP.4 – Display numerical data in plots on a number line, including dot plots, histograms, and box plots.	SP.7.2 Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. *For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.*	8.SP.1 Construct and interpret scatter plots for bivariate measurement of data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.

Student Friendly Language:

I can design a study to collect data on a population through a random and representative sample.
I can formulate survey questions to learn about a population.
I can use data that I collected from various random samples to make inferences about a population.
I can use a random sample to predict a common characteristic about a population.

Know (Factual)	Understand (Conceptual) The students will understand that:	Do (Procedural, Application, Extended Thinking)
• Representative sample produce valid inferences about a population. • Variation occurs in predictions based on sampling.	If a sample of a population is random and representative, valid inferences can be made about the population. Proportional reasoning can be used to make predictions about a population. Generating multiple samples for the same population allows for gauging the variation of estimates or predictions	Formulate a survey question. Determine how to collect a random sample that is representative of a population. Draw inferences about a population from data obtained in a random and representative sample. Generate multiple samples of the same size for making estimates and predictions.

Key Vocabulary:

population sample random sample representative sample inference
variation measures of center proportions

Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question "why do I have to learn this"?

Conduct a survey to estimate a fish population from a tagged population

Conduct a survey to estimate how many hours per week students spend on the internet. Is the estimate appropriate?

Conduct a survey to estimate how many students are involved in sports.

Conduct a survey to estimate how many hours students spend per night on homework.

Using the best sample, Conduct a survey to estimate the number of students who are in band.

SD Common Core State Standards Disaggregated Math Template

Domain:	Statistics and Probability	**Cluster:**	Draw informal comparative inferences about two populations	**Grade level:**	7

Correlating Standard in Previous Year	Number Sequence & Standard	Correlating Standard in Following Year
6.SP.2 Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape. 6.SP.4 Display numerical data in plots on a number line, including dot plots, histograms, and boxplots. 6.SP.5 Summarize numerical data sets in relation to their context, such as: 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) Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered. d) Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.	7.SP.3 Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable.	8.SP.1 Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association. 8.SP.4 Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables. *For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores?*

Student Friendly Language:

I can find the difference between measures of center (mean, median) for multiple sets of data.
I can compare the measures of center for multiple sets of data on a variety of graphs.
I can compare the degree of visual overlap between two or more graphs.
I can estimate the variability of a data set.
I can compare the variability of multiple data sets.
I can use a graph to compare key information about multiple sets of data such as how their means or medians vary.

Know (Factual)	Understand (Conceptual) The students will understand that:	Do (Procedural, Application, Extended Thinking)
• Measures of Center: mean, median, mode • Measures of Variability: Mean absolute deviation, range • Multiples of variability	-Measures of center can be used to compare the variability between two sets of data. -Measures of variability such as mean absolute deviation can be used to determine how widespread a set of data is. -Differences between the measures of center and variability between multiple sets of data show how the sets of data different. -Variabilities can be expressed and compared as multiples of one another.	-Find the measures of variability of a set of data. -Compare the differences between the measures of center and variability between multiple sets of data. -Use measures of center and variability to visually analyze the overlap of data set displayed on a graph. -Express the measure of center as a multiple of the measure of variability.

Key Vocabulary:

Mean Median Mode Range Measures of center Measures of variability Mean absolute deviation
Multiple of a measure of variability Quartile Interquartile range Dot plot Line graph Box and whisker plot

Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question "why do I have to learn this"?

Compare the heights of the soccer players and basketball players.

Comparing amount of sleep (or anything) between males and females in the same age group.

Comparing the amount of text messages sent (or anything) between different age groups or male and female.

Jason wanted to compare the mean height of the players on his favorite basketball and soccer teams. He thinks the mean height of the players on the basketball team will be greater but doesn't know how much greater. He also
wonders if the variability of heights of the athletes is related to the sport they play. He thinks that there will be a
greater variability in the heights of soccer players as compared to basketball players. To find out the answer, he must consider the following questions.

How do the graphs overlap?
What is the difference between measures of center between the two data sets?
What is the mean absolute deviation of each data set? How do they compare?
How do the measures of variability compare?
How can I represent the difference between the measures of center as a multiple of the measure of variability?

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Domain:	Statistics and Probability	**Cluster:**	Draw informal comparative inferences about two populations	**Grade level:**	7

Correlating Standard in Previous Year	Number Sequence & Standard	Correlating Standard in Following Year
6.SP.2 Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape. 6.SP.4 Display numerical data in plots on a number line, including dot plots, histograms, and boxplots. SP.6.5 Summarize numerical data sets in relation to their context, such as: 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) Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered. d) Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.	7.SP.4 Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.	8.SP.1 Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association. SP.8.4 Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables. *For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores?*

Student Friendly Language:

I can find measures of center and use them to compare two populations.
I can find measures of variability and use them to compare two populations.
I can use my data to make inferences about two populations.

Know (Factual)	Understand (Conceptual) The students will understand that:	Do (Procedural, Application, Extended Thinking)
• Measures of Center: mean, median, mode • Measures of Variability: mean absolute deviation, range • Random sampling • Comparative inference	-Measures of center can be used to make inferences about a population. -Measures of variability can be used to make inferences about a population. -Measures of center and variability can be used to compare populations.	-Make inferences about a population by using measures of center. -Make inferences about a population by using measures of variability. -Draw conclusions from random sample data to compare and analyze two populations.

Key Vocabulary:

Mean Median Mode Measures of center Measures of variability Mean absolute deviation
Range Quartile Interquartile range Dot plot Line graph Histogram
Box and Whisker Plot Unbiased Biased Random sampling Comparative inference

Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question "why do I have to learn this"?

Conduct a survey to analyze and compare the amount of time spent on homework at different grade levels.

Conduct a survey to analyze and compare the usage of internet or gaming systems between different ages, genders or students living in different countries.

Conduct a survey to collect and analyze data between different grades/ages of students in regards to a change at school, such as a different lunch menu.

When given two sets of data, students can use measures of center and measures of variability to make comparative inferences about two populations. For example, examine the following data sets and using measures of center and measures of variability, infer which data set could represent a set of middle school students and which set of data could represent a set of K-2 student and justify your reasoning.

Jumping Jacks Data Group 1: 1, 2, 4, 4, 6, 7, 7, 8, 8, 9, 12, 15

Jumping Jacks Data Group 2: 2, 3, 5, 9, 10, 10, 13, 17, 18, 19, 19, 20, 28

SD Common Core State Standards Disaggregated Math Template

Domain:	Statistics and Probability	**Cluster:**	Investigate chance processes and develop, use, and evaluate probability models	**Grade level:**	7

Correlating Standard in Previous Year	Number Sequence & Standard	Correlating Standard in Following Year
6.RP.1 Understand the concept of a ratio language to describe a ratio relationship between two quantities. *For example, "The ratio of wings to beaks in the birdhouse at the zoo was 2:1, because for every 2 wings there was 1 beak." "For ever vote candidate A received, candidate C received nearly three votes."*	7.SP.5 Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring.Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.	None (Does build to further standards in 7th grade and later in high school.)

Student Friendly Language:
I can determine how likely or unlikely an event will occur. I can represent the likelihood of an event occurring with a number between 0 and 1.

Know (Factual)	Understand (Conceptual) The students will understand that:	Do (Procedural, Application, Extended Thinking)
• Probability • Likely/Unlikely • Event	The probability of an event is the likelihood or chance that it will occur that is represented by a number between 0 and 1. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.	Determine the likelihood of an event based on a given probability between 0 and 1 written in decimal, fraction and/or percent form. State whether a given event is unlikely, neither unlikely nor likely, or likely.

Key Vocabulary:				
probability	chance	event	likely	unlikely

Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question "why do I have to learn this"?

Have students give examples of real world events that are likely and/or unlikely such as: the probability it will snow in Florida, the probability that school will be canceled a day in February, or the probability that a coin will land on heads.

Weather, "What is the probability it will rain today?"

Sports, "What is the team's chances of winning the state tournament?"

Lottery, "What is the chance you will win the lottery?"

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Correlating Standard in Previous Year	Number Sequence & Standard	Correlating Standard in Following Year
6.RP.1 Understand the concept of a ratio language to describe a ratio relationship between two quantities. *For example, "The ratio of wings to beaks in the birdhouse at the zoo was 2:1, because for every 2 wings there was 1 beak." "For ever vote candidate A received, candidate C received nearly three votes."*	7.SP.6 Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times.	(They will continue to build on this in high school.)

Student Friendly Language:
I can perform an experiment and collect data in order to determine the chance an event will happen. I can use the chance an event will occur to predict what will happen in an experiment.

Know (Factual)	Understand (Conceptual) The students will understand that:	Do (Procedural, Application, Extended Thinking)
• Experimental Probability • Theoretical Probability • Relative Frequency • Sample Space • Predictions • Table • Organized list	Probability or the chance an event will occur can be modeled by an experiment. Experimental probability is based on the frequency of an event occurring during an experiment. Theoretical probability represents what should happen during an experiment. Relative frequency of an event should be close to the theoretical probability but may not be exactly the same.	Collect and organize data during an experiment by observing the relative frequency of an event during an experiment. Calculate the experimental probability of an event. Calculate the theoretical probability of an event. Analyze data collection to make predictions about what should happen in an experiment.

Key Vocabulary:
probability chance experimental probability theoretical probability frequency relative frequency event outcome sample space table organized list
Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question "why do I have to learn this"?
Card Games, "What is the probability of being dealt a full house?" Carnival Games (Spinner, Darts, Lucky Duck), "What is the probability of choosing a winning duck?"

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Correlating Standard in Previous Year	Number Sequence & Standard	Correlating Standard in Following Year
6.SP.5 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. Giving quantitative measures of center (median and/or mean) and variability (interquartile and and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered. · d. Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.	7.SP.7 Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy. a. Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected. b. Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?	8.SP.4 Understanding that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables. For example, collect data from

Student Friendly Language:

I can design a probability model.

I can use a probability model to determine probabilities of events.

I can explain the difference between theoretical and experimental probability.

I can decide if an event will have an equal chance of happening.

I can decide if a game is fair or unfair.

Know (Factual)	Understand (Conceptual) The students will understand that:	Do (Procedural, Application, Extended Thinking)
• Predictions • Experiment • Trial • Uniform probability model • Equally likely or not equally lkely	The more trials conducted, the closer the experimental probability will be to the theoretical probability. Data must be collected to find experimental probability. Theoretical probability is found based on analyzing situations. Probabilities closer to one have a greater chance of occurring. Probabilities are represented as a fraction or decimal between 0 and 1 or as a percent between 0 and 100. To find all possible outcomes in a uniform probability model, you should use an organized list, chart or tree diagram to organize your data.	Design a model to simulate a situation and find the experimental or theoretical probability. Develop a probability model by observing the frequency of an event and gathering data to create charts, tables, lists or tree diagrams to find theoretical probability of a model. Compare experimental and theoretical probabilities and explain possible discrepancies. Develop a probability model to determine if an event is likely or unlikely to occur.

Key Vocabulary:

theoretical probability, experimental probability, predictions, experiment, outcomes, event, sample space, trials, uniform probability model

Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question "why do I have to learn this"?

Determine if all the possible outcomes in a game are equally likely to occur – would this make the game fair to all players?

Determine the number of possible options when ordering a sandwich from Subway.

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Correlating Standard in Previous Year	Number Sequence & Standard	Correlating Standard in Following Year
no previous standard	7.SP.8 Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation. a. Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs. b. Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., "rolling double sixes"), identify the outcomes in the sample space which compose the event. c. Design and use a simulation to generate frequencies for compound events. For example, use random digits as a simulation tool to approximate the answer to the question: If 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one with type A blood?	(Students will be building on this in high school.)

Student Friendly Language:

I can find the probability of a compound event by creating models such as lists, tables, and tree diagrams.

I can design and use a simulation to generate frequencies for compound events.

Know (Factual)	Understand (Conceptual) The students will understand that:	Do (Procedural, Application, Extended Thinking)
• Compound event • Tree diagram • Favorable outcomes • Total outcomes • Simulation • Fundamental Counting Principle	A compound event consists of two or more events. Compound events can be independent or dependent. There are similarities and differences of independent and dependent events. Two events are independent events if one event does not affect the occurrence of the other event. Two events are dependent events if the occurrence of one event affects the probability of another. The probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs. The Fundamental Counting Principle is more effective when there are several outcomes to choose from.	Calculate the probability of a compound event. Conduct an experiment to find the probability of a compound event. Draw a tree diagram of the outcomes for a compound event and place them in an organized list. Design and use a simulation to find frequencies of a compound event.

Key Vocabulary:

event compound event tree diagram organized list probability frequency table sample space

Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question "why do I have to learn this"?

Find the probability in various carnival games students have played.

Examples:

If you roll three standard number cubes once each, and you roll a 1, 2 and 3, you will win $50. What is the probability of winning the $50?

There is a bag with 100 numbers in it. You will reach in the bag a total of three times and replace the number each time. What is the probability that you will pull out a 5, 6 and 7?

There is a bag with the following bills in it. 1 - $1000, 5 - $100's, 5 - $10's and 1000 - $1's. After pulling out the first bill, you do not replace the bill. What is the probability of you pulling out a $1,000 and then a $100?

In a group of 20 balloons, 6 are filled with paper. What is the chance you pop 2 balloons with paper?

What is the probability of flipping a coin to get heads, roll a number cube to get a five, and then choose a red marble out of a bag of 3 marbles (red, blue, and green)?