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| MAT 220: Math 4 Today  30 week: Probability and Statistics | | | |
| Learning Targets | Unit Name | Instructional Resources | Vocabulary |
|  | Unit 1: Statistics As Problem Solving |  |  |
| I can...  -describe and differentiate between quantitative and qualitative data  -understand the four components of the problem-solving process in statistics  -identify variation, random error and bias in data sets | ~ About one week  Part A: Problem-Solving process  Part B: Data Measurement and Variation  Part C: Bias in Measurement  Part D: Bias in Sampling | [Statistics as Problem Solving](https://www.learner.org/series/learning-math-data-analysis-statistics-and-probability/statistics-as-problem-solving/)   1. [A Problem Solving Process](https://www.learner.org/series/learning-math-data-analysis-statistics-and-probability/statistics-as-problem-solving/a-problem-solving-process-15-minutes/) 2. [Data Measurement and Variation](https://www.learner.org/series/learning-math-data-analysis-statistics-and-probability/statistics-as-problem-solving/data-measurement-and-variation-65-minutes/) 3. [Bias in Measurement](https://www.learner.org/series/learning-math-data-analysis-statistics-and-probability/statistics-as-problem-solving/bias-in-measurement-20-minutes/) 4. [Bias in Sampling](https://www.learner.org/series/learning-math-data-analysis-statistics-and-probability/statistics-as-problem-solving/bias-in-sampling-20-minutes/) 5. [Assessment](https://www.learner.org/series/learning-math-data-analysis-statistics-and-probability/statistics-as-problem-solving/session-1-homework/) | bias, census, data, population, qualitative data, qualitative variables quantitative data, quantitative variables, random, error, random sample, representative sample, sample, variable, variation |
|  | Unit 2: Data Organization and Representation |  |  |
| I can...  -organize data in a line plot and frequency table  -organize data in a cumulative frequency table  -use intervals to answer a statistics question  -determine the median of a set of data  -determine relative frequencies and create bar graphs of your data | ~ About one week  Part A: Patterns in Variation  Part B: Line Plots  Part C: Frequency Tables  Part D: The Median  Part E: Bar Graphs and Relative Frequencies | [Data Organization and Representation](https://www.learner.org/series/learning-math-data-analysis-statistics-and-probability/data-organization-and-representation/)   1. [Patterns in Variation](https://www.learner.org/series/learning-math-data-analysis-statistics-and-probability/data-organization-and-representation/patterns-in-variation-10-minutes/) 2. [Line Plots](https://www.learner.org/series/learning-math-data-analysis-statistics-and-probability/data-organization-and-representation/line-plots-40-minutes/) 3. [Frequency Tables](https://www.learner.org/series/learning-math-data-analysis-statistics-and-probability/data-organization-and-representation/frequency-tables-40-minutes/) 4. [The Median](https://www.learner.org/series/learning-math-data-analysis-statistics-and-probability/data-organization-and-representation/the-median-from-ordered-lists-and-line-plots-25-minutes/) 5. [Bar Graphs and Relative Frequency](https://www.learner.org/series/learning-math-data-analysis-statistics-and-probability/data-organization-and-representation/bar-graphs-and-relative-frequencies-relative-frequency/) 6. [Data Organization and Representation](https://www.learner.org/series/learning-math-data-analysis-statistics-and-probability/data-organization-and-representation/) 7. [Assessment](https://www.learner.org/series/learning-math-data-analysis-statistics-and-probability/data-organization-and-representation/session-2-homework/) | cumulative frequency, cumulative frequency table, discrete data, distribution, frequency, frequency bar graph, frequency table, interval, line plot, median, mode, relative frequency, relative frequency bar graph |
|  | Unit 3: Describing Distributions |  |  |
| I can...  -organize and group data in a stem and leaf plot  -complete a frequency and relative frequency table for data  -create a frequency and relative frequency histogram for data  -complete a cumulative frequency and relative frequency table for data | ~ About one week  Part A: Organizing Data in a Stem and Leaf Plot  Part B: Histograms  Part C: Relative and Cumulative Frequencies  Part D: Ordering Hats | [Describing Distributions](https://www.learner.org/series/learning-math-data-analysis-statistics-and-probability/describing-distributions/)   1. [Organizing Data in a Stem and Leaf Plot](https://www.learner.org/series/learning-math-data-analysis-statistics-and-probability/describing-distributions/organizing-data-in-a-stem-and-leaf-plot-how-long-is-a-minute-55-minutes/) 2. [Histograms](https://www.learner.org/series/learning-math-data-analysis-statistics-and-probability/describing-distributions/histograms-constructing-a-histogram-30-minutes/) 3. [Relative and Cumulative Frequencies](https://www.learner.org/series/learning-math-data-analysis-statistics-and-probability/describing-distributions/relative-and-cumulative-frequencies-relative-frequencies-30-minutes/) 4. [Ordering Hats](https://www.learner.org/series/learning-math-data-analysis-statistics-and-probability/describing-distributions/ordering-hats-understanding-the-question-35-minutes/) 5. [Describing Distributions](https://www.learner.org/series/learning-math-data-analysis-statistics-and-probability/describing-distributions/) 6. [Assessment](https://www.learner.org/series/learning-math-data-analysis-statistics-and-probability/describing-distributions/homework/) | continuous variable, grouped frequency table, histogram, relative frequency histogram, stem and leaf plot |
|  | Unit 4: The Five-Number Summary |  |  |
| I can...  -understand and calculate the median  -understand and calculate quartiles  -represent the concepts of quartiles using graphs  -summarize an entire data set with a Five-Number summary  -summarize an entire data set with a box plot | ~ About one week  Part A: Min, Max, and the Two-Number Summary  Part B: The Median and the Three-Number Summary  Part C: Quartiles and the Five-Number Summary  Part D: The Box Plot  Part E: Finding the Five-Number Summary Numerically | [Min, Max, and the Five-Number Summary](https://www.learner.org/series/learning-math-data-analysis-statistics-and-probability/the-five-number-summary/session-4-homework/)   1. [The Data Set](https://www.learner.org/series/learning-math-data-analysis-statistics-and-probability/the-five-number-summary/min-max-and-the-two-number-summary-the-data-set-20-minutes/) 2. [The Median and the Three-Number Summary](https://www.learner.org/series/learning-math-data-analysis-statistics-and-probability/the-five-number-summary/the-median-and-the-three-number-summary-35-minutes-the-median/) 3. [Quartiles and the Five Number Summary](https://www.learner.org/series/learning-math-data-analysis-statistics-and-probability/the-five-number-summary/quartiles-and-the-five-number-summary-35-minutes-quartiles/) 4. [The Box Plot](https://www.learner.org/series/learning-math-data-analysis-statistics-and-probability/the-five-number-summary/the-box-plot-25-minutes-five-number-summary-with-measurement-data/) 5. [Finding the Five Number Summary Numerically](https://www.learner.org/series/learning-math-data-analysis-statistics-and-probability/the-five-number-summary/finding-the-five-number-summary-numerically-30-minutes-locating-the-median-from-ordered-data/) 6. [Assessment](https://www.learner.org/series/learning-math-data-analysis-statistics-and-probability/the-five-number-summary/session-4-homework/) | box plot, Five-Number Summary, interquartile range, midrange, quartiles, summary measures, Three-Number Summary, Two-Number Summary |
|  | Unit 5: Variation About the Mean |  |  |
| I can...  -understand the mean as an indicator of fair allocation and “balancing point” of a data set  -explore deviations of data values from the mean  -measure and calculate the variation and mean of a data set | ~ About one week  Part A: Fair Allocations  Part B: Unfair Allocations  Part C: Using Line Plots  Part D: Deviations from the Mean  Part E: Measuring Variation | [Variation About the Mean](https://www.learner.org/series/learning-math-data-analysis-statistics-and-probability/variation-about-the-mean/)   1. [Fair Allocations](https://www.learner.org/series/learning-math-data-analysis-statistics-and-probability/variation-about-the-mean/fair-allocations-25-minutes-the-mean/) 2. [Unfair Allocations](https://www.learner.org/series/learning-math-data-analysis-statistics-and-probability/variation-about-the-mean/unfair-allocations-25-minutes-fair-and-unfair-allocations/) 3. [Using Line Plots](https://www.learner.org/series/learning-math-data-analysis-statistics-and-probability/variation-about-the-mean/using-line-plots-30-minutes-creating-a-line-plot/) 4. [Deviations from the Mean](https://www.learner.org/series/learning-math-data-analysis-statistics-and-probability/variation-about-the-mean/deviations-from-the-mean-30-minutes-tallying-excesses-and-deficits/) 5. [Measuring Variation](https://www.learner.org/series/learning-math-data-analysis-statistics-and-probability/variation-about-the-mean/measuring-variation-45-minutes-mean-absolute-deviation-mad/) 6. [Variation About the Mean](https://www.learner.org/series/learning-math-data-analysis-statistics-and-probability/variation-about-the-mean/) 7. [Assessment](https://www.learner.org/series/learning-math-data-analysis-statistics-and-probability/variation-about-the-mean/session-5-homework/) | allocation, deviation from the mean, fair allocation (equal-shares allocation), mean, mean absolute deviation (MAD), standard deviation, variance |
|  | Unit 6: Designing Experiments |  |  |
| I can...  -Investigate comparative studies, which can be experimental or observational  - Learn how to analyze and interpret results from comparative studies - Learn how to design a comparative experiment  -Explore paired and unpaired comparative studies | ~ About one week  Part A: Comparative Studies  Part B: Comparative Observational Studies  Part C: Comparative Experimental Studies | [Designing Experiments](https://www.learner.org/series/learning-math-data-analysis-statistics-and-probability/designing-experiments/) | comparative experimental study, comparative observational study, comparative study, design of a comparative study, random assignment, treatment b |
|  | Unit 7: Bivariate Data and Analysis |  |  |
| I can...  -graph bivariate data in a scatter plot  -divide the points in a scatter plot into four quadrants  -model linear relationships  -explore the least squares line | ~ About one week  Part A: Scatter Plots  Part B: Contingency Tables  Part C: Modeling Linear Relationships  Part D: Fitting Lines to Data | [Bivariate Data and Analysis](https://www.learner.org/series/learning-math-data-analysis-statistics-and-probability/bivariate-data-and-analysis/) | association, bivariate analysis, contingency table, co-variation, least squares line, line of best fit, quadrants, scatter plot, sum of squared errors |
|  | Unit 8: Probability |  |  |
| I can...  -investigate probability by exploring the following:  -Random events  -Games of chance  -Finite  -equally likely probability models  -Mathematical probabilities and the probability table -Tree diagrams  -The binomial probability model | ~ About one week  Part A: Probability in Statistics  Part B: Mathematical Probability  Part C: Analyzing Binomial Probabilities  Part D: Are You a Random Player? | [Probability](https://www.learner.org/series/learning-math-data-analysis-statistics-and-probability/probability/) | binomial experiment, binomial probability model, experimental probability, mathematical probability, outcome, Pascal’s Triangle, probability table, random experiment, tree diagram |
|  | Unit 9: Random Sampling and Estimation |  |  |
| I can...  -Define an estimate based on sample data  -Select a random sample  -Describe sample-to-sample variation - Predict the accuracy of an estimate  -Assess the effect of sample size on the accuracy of an estimate | ~ About one week  Part A: Random Samples  Part B: Selecting the Sample  Part C: Investigating Variation in Estimates  Part D: The Effect of Sample Size | [Random Sampling and Estimation](https://www.learner.org/series/learning-math-data-analysis-statistics-and-probability/random-sampling-and-estimation/) | sample mean, sample size, sampling with replacement, sampling without replacement |
|  | Unit 10: Casino Royale Project |  |  |
| I can...  - design a game that gives the player and the game designer an equal chance of winning.  -create, analyze and advertise my own game | ~ About one week  Students will create their own game and can test/play their game with their peers. See attachment for directions. | [End of Quarter Project](https://nfschools-my.sharepoint.com/:b:/g/personal/cdubois_nfschools_net/EQK3xcMab_FJjGJ2JYsf2rwBvW9-ODVzyHyDRE-E56F01w?e=U2uUcw) | Probability model, winning outcomes, probability analysis, expected value |