Learning Targets & Components

Chapter 4	1	**Identify Population, Sample, Parameters and Statistics of a Study**
	Identify Population and Sample of a Study	
	Describe the scope of inference from a study.	
	Describe the meaning of statistical significance of a study.	
Chapter 4	2	**Design & Analyze Sampling techniques for a study**
	Describe methods for finding SRS, stratified random sampling, cluster sampling.	
	Identify Bias from Volunteer and Conveniance Sampling	
	Identify Bias from undercoverage, wording and nonresponse	
Chapter 4	3	**Apply ideas of Experimental Design**
	Design a study using completely randomized design, blocking, and/or matched pairs design.	
	Identify Confounding Variables in a Study	
	Contrast Observational Study vs Experiment	
	Identify experimental units, treatments, and variables of a study.	
	Describe the placebo effect and the purpose of blinding a study.	
Chapter 1	4	**Analyze and Create Summaries of Categorical Data**
	analyze/create bar graphs, pie charts,	
	identify graphs that are deceptive	
	calculate marginal and conditinoal distributions in two-way tables	
Chapter 1	5	**Analyze and Calculate Summaries of Quantitative Data**
	Analyze/Create histograms, stem&leaf, box, and dot plots	
	choose appropriate measures of center and spread	
	identify outliers	
	describe and compare distributions	
Chapter 3	6	**Analyze and Create Scatterplots to Summarize BiVariate Data**
	create/describe a scatterplot (form, strength, direction, outliers)	
	calculate/interpret the correlation	
	interpret the slope & y-intercept of the regression line	
	calcluate and interpret residuals	
	create and interpret a residual plot to assess whether the linear model is appropriate	
	calculate/interpret the standard deviation fo the residuals and r^2 to assess the line of best fit	
Chapter 2	7	**Find and Interpret Percentiles & Z-scores**
	calculate and interpret percentiles	
	estimate percentiles froma cumulative frequency graph	
	calclate and interpret z-scores	
	describe the effect of adding/subtracting/multiplying/dividing on a distribution of data	
Chapter 2	8	**Solve Problems involving Density Curves and Normal Distribution**
	estimate the mean and median of a density curve	
	Apply the Empirical rule in a Normal Distribution	
	Use Table A to solve problems with percentiles & z-scores	
	Determine whether data is approximately normal	
Chapter 5	9	**Solve Problems involving Probability**
	Solve basic probabilty problems	
	Understand the Law of Large Numbers & Myths of Probability	
	Design & Run SImulations to model probability situations	
	Calculate probabilities using Two-way tables & Venn Diagrams	
	Use the general addition rule to calculate probabilities	
Chapter 5	10	**Solve Problems involving Conditional Probabilty**
	calculate and interpret conditional probabilities	
	use the general multiplication rule to calculate probabilities	
	calculate probabilities involving two or more events	
	calculate probabilities involving independent events	

Chapter 6	11	**Solve problems involving Discrete and Continous Random Variables**
	compute probability using probability distribution of discrete random variable	
	calculate and interpret the mean of a discrete random variable	
	calculate and interpret the standard deviation of a discrete random variable	
	compute probability using probability distribution of continous random variable	
	find the mean/standard deviation/probability involving sum/difference of independent random variables	
Chapter 6	12	**Solve problems involving Binomial and Geometric Variables**
	determine whether the conditions for using a binomial random variable are met	
	compute and interpret probabilities involving binomial distributions	
	calculate and interpret the mean and standard deviation of a binomial random variable	
	find probabilities involving geometric random variables	
Chapter 7	13	**Sampling Distributions**
	distinguish between a parameter and a statistics	
	distinguish between a population, distribution of a sample, and sampling distribution of a statistic	
	use the samplling distribution of a statistic to evaluate a claim about a parameter	
	describe the relationship between sample size and variability of a statistic	
Chapter 7	14	**Sample Proportions**
	calculate the mean & standard deviation of the sampling distribution of a sample proportion (p-hat)	
	determine if the sampling distribution is approximately normal	
	use Normal distribution to calculate probabilities involving p-hat	
Chapter 7	15	**Sample Means**
	calculate the mean & standard deviation of the sampling distribution of a sample proportion (x-bar)	
	use Normal distribution to calculate probabilities involving p-hat	
	explain how the shape of the sampling distribution of x-bar is affected by the shape of the population distribution	
Chapter 8	16	**Confidence Intervals**
	interpret a confidence interval and confidence level in context	
	determine the point level and margin of error from a confidence interval	
	describe how the sample size and confidence level affect the length of a confidence interval	
	explain how practical issues can affect the interpretation of a confidence interval	
Chapter 8	17	**Estimating a Population Proportion**
	state and check the random, 10% and large counts conditions for constructing a confidence interval (population proportion)	
	determine critical values for calculating a C% confidence interval (population proportion)	
	construct and interpret a confidence interval for a population proportion	
	determine the sample size required to obtain a C% confidence interval with a specified margin of error	
Chapter 8	18	**Estimating a Population Mean**
	explain how t distriubtions are different from the standard normal distributions	
	determine critical values for calculating a C% confidence interval (population mean)	
	state and check the random, 10% and large counts conditions for constructing a confidence interval (population mean)	
	construct and interpret a confidence interval for a population mean	
	determine the sample size required to obtain a C% confidence interval with a specified margin of error (population mean)	
Chapter 9	19	**Significance Tests**
	state the null and alternative hypothesis for a significance test about a population parameter	
	interpret the p-value in context	
	determine if the results of a study are statistically significant	
	interpret a Type I and Type II error	
Chapter 9	20	**Tests for Population Proportion**
	perform a significance test about population proportion	
	state and check the random, 10% and large counts conditions for performing a significance test	
	use a confidence interval to draw a conclusion for a two-sided-test	

		interpret the power of a test
		describe the relationship among probability of a Type I error, Type II error, and the power of a test
Chapter 9	**21**	**Tests for Population Mean**
		perform a significance test about population mean
		state and check the random, 10% and large counts conditions for performing a significance test
		use a confidence interval to draw a conclusion for a two-sided test
		perform a significance test about a mean difference usign paired data
Chapter 10	**22**	**Comparing Two Proportions**
		describe the shape center and spread of the sampling distribution p-hat1 - p-hat2
		determine whether the conditions are met for inference about p-hat1 - p-hat2
		construct and interpret a confidence interval to compare two proportions
		perform a significance test to compare two proportions
Chapter 10	**23**	**Comparing Two Means**
		describe the shape center and spread of the sampling distribution x-bar1 - x-bar2
		determine whether the conditions are met for inference about mu1 - mu2
		construct and interpret a confidence interval to compare two means
		perform a significance test to compare two means
Chapter 11	**24**	**Chi-Square Tests for Goodness of Fit**
		calculate ch-square statistics, degrees of freedom, and P-value for a chi-square test for goodness fit
		perform a chi-square test for goodness fit
Chapter 11	**25**	**Inference for Two-Way Tables**
		calculate ch-square statistics, degrees of freedom, and P-value for a chi-square test based on two-way table
		perform a chi-square test for homogeneity
		perform a chi-square test for independence
		choose the appropriate chi-square test
Chapter 12	**26**	**Inference for Linear Regression**
		check the conditions for regresssion inference
		interpret the values of a, b, s SE, and r^2 in context
		construct and interpret a confidence interval for the slope of a regression line
		perform a significance test about the slope of the regression line
Chapter 13	**27**	**F-distribution * ANOVA**
		calculate f-statistic
		find cumulative probability from f-dsitribution
		compare 3 or more means
		significance testing
		hypothesis testing