The Practice of Statistics 6th edition Pacing Guide (110 days)

Chapter 1

Day	Topics	**Learning Targets** Students will be able to …	**Suggested Assignment (MC bold)**
1	Chapter 1 Introduction	• Identify the individuals and variables in a set of data. • Classify variables as categorical or quantitative.	1, 5, 7, **9, 10**
2	1.1 Bar Graphs and Pie Charts, Graphs: Good and Bad, Analyzing Data on Two Categorical Variables	• Make and interpret bar graphs for categorical data. • Identify what makes some graphs of categorical data misleading. • Calculate marginal and joint relative frequencies from a two-way table.	13, 15, 17, 19, 21, 23
3	1.1 Relationships Between Two Categorical Variables	• Calculate conditional relative frequencies from a two-way table. • Use bar graphs to compare distributions of categorical data. • Describe the nature of the association between two categorical variables.	27, 29, 33, 35, **40–43**
4	1.2 Dotplots, Stemplots, Histograms, Describing Shape	• Make and interpret dotplots, stemplots, and histograms of quantitative data. • Identify the shape of a distribution from a graph.	45, 49, 51, 59, 63
5	1.2 Describing Distributions, Comparing Distributions, Using Histograms Wisely	• Describe the overall pattern (shape, center, and variability) of a distribution and identify any major departures from the pattern (outliers). • Compare distributions of quantitative data using dotplots, stemplots, and histograms.	55, 65, 69, 77, **80–85**
6	1.3 Measuring Center: Mean and Median, Comparing the Mean and Median, Measuring Variability: Range, Standard Deviation and *IQR*	• Calculate measures of center (mean, median) for a distribution of quantitative data. • Calculate and interpret measures of variability (range, standard deviation, *IQR*) for a distribution of quantitative data. • Explain how outliers and skewness affect measures of center and variability.	87, 89, 91, 95, 97, 101, 103, 105, 121
7	1.3 Identifying Outliers, Making and Interpreting Boxplots, Comparing Distributions with Boxplots	• Identify outliers using the $1.5 \times IQR$ rule. • Make and interpret boxplots of quantitative data. • Use boxplots and numerical summaries to compare distributions of quantitative data.	109, 111, 113, 115, **123–126**
8	Chapter 1 Review/FRAPPY!		Chapter 1 Review Exercises
9	Chapter 1 Test		

Chapter 2

Day	Topics	**Learning Targets** Students will be able to…	**Suggested Assignment (MC bold)**
1	2.1 Measuring Location: Percentiles, Cumulative Relative Frequency Graphs, Measuring Location: *z*-Scores	• Find and interpret the percentile of an individual value within a distribution of data. • Estimate percentiles and individual values using a cumulative relative frequency graph. • Find and interpret the standardized score (*z*-score) of an individual value within a distribution of data.	1, 3, 7, 9, 11, 13, 15, 19
2	2.1 Transforming Data	• Describe the effect of adding, subtracting, multiplying by, or dividing by a constant on the shape, center, and variability of a distribution of data.	21, 25, 29, 31, **33–38**
3	2.2 Density Curves, Describing Density Curves, Normal Distributions, The 68–95–99.7 Rule	• Use a density curve to model distributions of quantitative data. • Identify the relative locations of the mean and median of a distribution from a density curve. • Use the 68–95–99.7 rule to estimate (i) the proportion of values in a specified interval, or (ii) the value that corresponds to a given percentile in a Normal distribution.	41, 45, 47, 49, 51
4	2.2 Finding Areas in a Normal Distribution, Working Backward: Finding Values from Areas	• Find the proportion of values in a specified interval in a Normal distribution using Table A or technology. • Find the value that corresponds to a given percentile in a Normal distribution using Table A or technology.	53, 55, 57, 59, 61, 63
5	2.2 Assessing Normality	• Determine whether a distribution of data is approximately Normal from graphical and numerical evidence.	73, 75, 77, 79, 81, **85–90**
6	Chapter 2 Review/FRAPPY!		Chapter 2 Review Exercises
7	Chapter 2 Test		

Chapter 3

Day	Topics	**Learning Targets** Students will be able to …	**Suggested Assignment (MC bold)**
1	3.1 Explanatory and Response Variables, Displaying Relationships: Scatterplots, Describing a Scatterplot	• Distinguish between explanatory and response variables for quantitative data. • Make a scatterplot to display the relationship between two quantitative variables. • Describe the direction, form, and strength of a relationship displayed in a scatterplot and identify unusual features.	1, 3, 5, 9, 11
2	3.1 Measuring Linear Association: Correlation, Cautions about Correlation, Calculating Correlation, Additional Facts about Correlation	• Interpret the correlation. • Understand the basic properties of correlation, including how the correlation is influenced by outliers. • Distinguish correlation from causation.	13, 15, 17, 19, 23, **29–34**
3	3.2 Prediction, Residuals, Interpreting a Regression Line	• Make predictions using regression lines, keeping in mind the dangers of extrapolation. • Calculate and interpret a residual. • Interpret the slope and *y* intercept of a least-squares regression line.	37, 39, 41, 43, 45
4	3.2 The Least-Squares Regression Line, Determining if a Linear Model is Appropriate: Residual Plots	• Determine the equation of a least-squares regression line using technology or computer output. • Construct and interpret residual plots to assess whether a regression model is appropriate.	47, 49, 51, 53
5	3.2 How Well the Line Fits the Data: The Role of *s* and r^2 in Regression, Interpreting Computer Regression Output	• Interpret the standard deviation of the residuals and r^2 and use these values to assess how well the least-squares regression line models the relationship between two variables. • Describe how the slope, *y* intercept, standard deviation of the residuals, and r^2 are influenced by outliers.	55, 57, 59, 67
6	3.2 Regression to the Mean, Correlation and Regression Wisdom	• Find the slope and *y* intercept of the least-squares regression line from the means and standard deviations of *x* and *y* and their correlation.	63, 65, **71–78**
7	Chapter 3 Review/FRAPPY!		Chapter 3 Review Exercises
8	Chapter 3 Test		

Chapter 4

Day	Topics	**Learning Targets** Students will be able to…	**Suggested Assignment (MC bold)**
1	4.1 The Idea of a Sample Survey, How to Sample Badly, How to Sample Well: Random Sampling	• Identify the population and sample in a statistical study. • Identify voluntary response sampling and convenience sampling and explain how these sampling methods can lead to bias. • Describe how to select a simple random sample with technology or a table of random digits.	1, 3, 5, 7, 11, 13, 15
2	4.1 Other Random Sampling Methods	• Describe how to select a sample using stratified random sampling and cluster sampling, distinguish stratified random sampling from cluster sampling, and give an advantage of each method.	17, 19, 21, 22, 23
3	4.1 Sample Surveys: What Else Can Go Wrong?	• Explain how undercoverage, nonresponse, question wording, and other aspects of a sample survey can lead to bias.	25, 27, 29, 31, 33, **35–40**
4	4.2 Observational Studies Versus Experiments, The Language of Experiments	• Explain the concept of confounding and how it limits the ability to make cause-and-effect conclusions. • Distinguish between an observational study and an experiment, and identify the explanatory and response variables in each type of study. • Identify the experimental units and treatments in an experiment.	43, 45, 47, 49, 51, 53
5	4.2 Designing Experiments: Blinding and the Placebo Effect, Designing Experiments: Random Assignment	• Describe the placebo effect and the purpose of blinding in an experiment. • Describe how to randomly assign treatments in an experiment using slips of paper, technology, or a table of random digits.	57, 59, 61, 63
6	4.2 Designing Experiments: Comparison, Control, Replication, and Putting It All Together; Completely Randomized Designs	• Explain the purpose of comparison, random assignment, control, and replication in an experiment. • Describe a completely randomized design for an experiment.	55, 65, 67, 69
7	4.2 Randomized Block Designs	• Describe a randomized block design and a matched pairs design for an experiment and explain the purpose of blocking in an experiment.	71, 75, 77, 79, **83–90**
8	4.3 Inference for Sampling, Inference for Experiments	• Explain the concept of sampling variability when making an inference about a population and how sample size affects sampling variability. • Explain the meaning of statistically significant in the context of an experiment and use simulation to determine if the results of an experiment are statistically significant.	93, 95, 97, 99

9	4.3 The Scope of Inference: Putting it All Together, The Challenges of Establishing Causation, Data Ethics (optional)	• Identify when it is appropriate to make an inference about a population and when it is appropriate to make an inference about cause and effect. • Evaluate if a statistical study has been carried out in an ethical manner.	103, 105, 107, **117–118** (109, 111, 113, 115 optional)
10	Chapter 4 Review/FRAPPY!		Chapter 4 Review Exercises
11	Chapter 4 Test		Cumulative AP Practice Test 1

Chapter 5

Day	Topics	**Learning Targets** Students will be able to…	**Suggested Assignment (MC bold)**
1	5.1 The Idea of Probability	• Interpret probability as a long-run relative frequency.	1, 3, 5, 7
2	5.1 Simulation	• Use simulation to model chance behavior.	9, 11, 15, 21, **23–28**
3	5.2 Probability Models, Basic Probability Rules	• Give a probability model for a chance process with equally likely outcomes and use it to find the probability of an event. • Use basic probability rules, including the complement rule and the addition rule for mutually exclusive events.	31, 33, 35, 37, 39
4	5.2 Two-Way Tables, Probability, and the General Addition Rule, Venn Diagrams and Probability	• Use a two-way table or Venn diagram to model a chance process and calculate probabilities involving two events. • Apply the general addition rule to calculate probabilities.	41, 47, 49, 51, 53, **55–58**
5	5.3 What Is Conditional Probability?, Conditional Probability and Independence, The General Multiplication Rule	• Calculate and interpret conditional probabilities. • Determine whether two events are independent. • Use the general multiplication rule to calculate probabilities.	61, 63, 65, 67, 69, 71, 77, 79
6	5.3 Tree Diagrams and Conditional Probability, The Multiplication Rule for Independent Events	• Use a tree diagram to model a chance process involving a sequence of outcomes and to find probabilities. • When appropriate, use the multiplication rule for independent events to calculate probabilities.	81, 83, 87, 89, 91, 93, 99, **103–106**
7	Chapter 5 Review/FRAPPY!		Chapter 5 Review Exercises
8	Chapter 5 Test		

Chapter 6

Day	Topics	**Learning Targets** Students will be able to…	**Suggested Assignment (MC bold)**
1	6.1 Discrete Random Variables, Analyzing Discrete Random Variables: Describing Shape, Measuring Center: The Mean (Expected Value) of a Discrete Random Variable	• Use the probability distribution of a discrete random variable to calculate the probability of an event. • Make a histogram to display the probability distribution of a discrete random variable and describe its shape. • Calculate and interpret the mean (expected value) of a discrete random variable.	1, 3, 5, 7, 9, 11
2	6.1 Measuring Variability: The Standard Deviation (and Variance) of a Discrete Random Variable, Continuous Random Variables	• Calculate and interpret the standard deviation of a discrete random variable. • Use the probability distribution of a continuous random variable (uniform or Normal) to calculate the probability of an event.	13, 19, 21, 23, 27, 29, **31–34**
3	6.2 Transforming a Random Variable	• Describe the effect of adding or subtracting a constant or multiplying or dividing by a constant on the probability distribution of a random variable.	37, 39, 41, 43, 47
4	6.2 Combining Random Variables, Standard Deviation of the Sum or Difference of Two Random Variables, Combining Normal Random Variables	• Calculate the mean and standard deviation of the sum or difference of random variables. • Find probabilities involving the sum or difference of independent Normal random variables.	49, 51, 55, 57, 59, 65, 67, **73–74**
5	6.3 Binomial Settings and Binomial Random Variables, Calculating Binomial Probabilities	• Determine whether the conditions for a binomial setting are met. • Calculate and interpret probabilities involving binomial distributions.	77, 79, 81, 83, 85, 89
6	6.3 Describing a Binomial Distribution: Shape, Center, and Variability; Binomial Distributions in Statistical Sampling, The Normal Approximation to Binomial Distributions (optional)	• Calculate the mean and standard deviation of a binomial random variable. Interpret these values in context. • When appropriate, use the Normal approximation to the binomial distribution to calculate probabilities.	91, 93, 95, 99, 101, 105 (103, 106, 117 optional)
7	6.3 Geometric Random Variables	• Find probabilities involving geometric random variables.	107, 109, 111 **113–116**
8	Chapter 6 Review/FRAPPY!		Chapter 6 Review Exercises
9	Chapter 6 Test		

MIDTERM EXAM REVIEW: 3 DAYS

MIDTERM EXAM: 1 DAY

Chapter 7

Day	Topics	**Learning Targets** Students will be able to…	**Suggested Assignment (MC bold)**
1	7.1 Parameters and Statistics, The Idea of a Sampling Distribution	• Distinguish between a parameter and a statistic. • Create a sampling distribution using all possible samples from a small population.	1, 3, 5, 7, 9
2	7.1 The Idea of a Sampling Distribution, Describing Sampling Distributions	• Use the sampling distribution of a statistic to evaluate a claim about a parameter. • Distinguish among the distribution of a population, the distribution of a sample, and the sampling distribution of a statistic. • Determine if a statistic is an unbiased estimator of a population parameter. • Describe the relationship between sample size and the variability of a statistic.	11, 13, 15, 19, 21, 25, **26–30**
3	7.2 The Sampling Distribution of $\hat{p}$, Using the Normal Approximation for $\hat{p}$.	• Calculate the mean and standard deviation of the sampling distribution of a sample proportion $\hat{p}$ and interpret the standard deviation. • Determine if the sampling distribution of $\hat{p}$ is approximately Normal. • If appropriate, use a Normal distribution to calculate probabilities involving $\hat{p}$.	35, 37, 41, 43, **47–50**
4	7.3 The Sampling Distribution of $\overline{x}$, Sampling from a Normal Population	• Calculate the mean and standard deviation of the sampling distribution of a sample mean $\overline{x}$ and interpret the standard deviation. • Explain how the shape of the sampling distribution of $\overline{x}$ is affected by the shape of the population distribution and the sample size. • If appropriate, use a Normal distribution to calculate probabilities involving $\overline{x}$.	53, 55, 57, 61
5	7.3 The Central Limit Theorem	• Explain how the shape of the sampling distribution of $\overline{x}$ is affected by the shape of the population distribution and the sample size. • If appropriate, use a Normal distribution to calculate probabilities involving $\overline{x}$.	63, 65, 67, 69, 71, **73–76**
6	Chapter 7 Review/FRAPPY!		Chapter 7 Review Exercises
7	Chapter 7 Test		Cumulative AP® Practice Exam 2

Chapter 8

Day	Topics	**Learning Targets** Students will be able to…	**Suggested Assignment (MC bold)**
1	Chapter 8 Introduction, 8.1 The Idea of a Confidence Interval, Interpreting Confidence Intervals	• Identify an appropriate point estimator and calculate the value of a point estimate. • Interpret a confidence interval in context. • Determine the point estimate and margin of error from a confidence interval. • Use a confidence interval to make a decision about the value of a parameter.	1, 3, 5, 7, 9
2	8.1 Interpreting Confidence Level, What Affects the Margin of Error?	• Interpret a confidence level in context. • Describe how the sample size and confidence level affect the margin of error. • Explain how practical issues like nonresponse, undercoverage, and response bias can affect the interpretation of a confidence interval.	11, 15, 17, 19, 21, **23-26**
3	8.2 Constructing a Confidence Interval for p	• State and check the Random, 10%, and Large Counts conditions for constructing a confidence interval for a population proportion. • Determine the critical value for calculating a C% confidence interval for a population proportion using a table or technology.	29, 31, 35, 37, 39
4	8.2 Putting It All Together: The Four-Step Process, Choosing the Sample Size	• Construct and interpret a confidence interval for a population proportion. • Determine the sample size required to obtain a C% confidence interval for a population proportion with a specified margin of error.	41, 45, 49, **55-58**
5	8.3 The Problem of unknown σ, Conditions for Estimating μ	• Determine the critical value for calculating a C% confidence interval for a population mean using a table or technology. • State and check the Random, 10%, and Normal/Large Sample conditions for constructing a confidence interval for a population mean.	61, 63, 65, 67
6	8.3 Constructing a Confidence Interval for μ, Choosing the Sample Size	• Construct and interpret a confidence interval for a population mean. • Determine the sample size required to obtain a C% confidence interval for a population mean with a specified margin of error.	69, 73, 77, **81-84**
7	Chapter 8 Review/FRAPPY!		Chapter 8 Review Exercises
8	Chapter 8 Test		

Chapter 9

Day	Topics	**Learning Targets** Students will be able to…	**Suggested Assignment (MC bold)**
1	Chapter 9 Introduction; 9.1 Stating Hypotheses, Interpreting *P*-values, Making Conclusions	• State appropriate hypotheses for a significance test about a population parameter. • Interpret a *P*-value in context. • Make an appropriate conclusion for a significance test.	1, 3, 5, 7, 9, 13, 14, 15, 19
2	9.1 Type I and Type II Errors	• Interpret a Type I and a Type II error in context. Give a consequence of each error in a given setting.	21, 23, 25, 27, **29-32**
3	9.2 Performing a Significance Test About *p*	• State and check the Random, 10%, and Large Counts conditions for performing a significance test about a population proportion. • Calculate the standardized test statistic and *P*-value for a test about a population proportion.	35, 37, 39, 41
4	9.2 Putting It All Together: One-Sample *z* Test for *p*, Two-Side Tests	• Perform a significance test about a population proportion.	43, 45, 47, 51, 53, 55, **59-62**
5	9.3 Carrying Out a Significance Test for μ , Putting It All Together: One-Sample *t* Test for μ	• State and check the Random, 10%, and Normal/Large Sample conditions for performing a significance test about a population mean. • Calculate the standardized test statistic and *P*-value for a test about a population mean. • Perform a significance test about a population mean.	65, 67, 69, 73, 77, 79
6	9.3 Two-Sided Tests and Confidence Intervals, The Power of a Test, Using Tests Wisely	• Use a confidence interval to make a conclusion for a two-sided test about a population parameter. • Interpret the power of a significance test and describe what factors affect the power of a test.	81, 85, 87, 93, 95, 97, **102-108**
7	Chapter 9 Review/FRAPPY!		Chapter 9 Review Exercises
8	Chapter 9 Test		

Chapter 10

Day	Topics	**Learning Targets** Students will be able to…	**Suggested Assignment (MC bold)**
1	"Who Likes Tattoos?" Activity, 10.1 The Sampling Distribution of a Difference between Two Proportions	• Describe the shape, center, and variability of the sampling distribution of $\hat{p}_1 - \hat{p}_2$.	1, 3
2	10.1 Confidence Intervals for $p_1 - p_2$	• Determine whether the conditions are met for doing about a difference between two proportions. • Construct and interpret a confidence interval for a difference between two proportions.	5, 7, 9, 11, 13
3	10.1 Significance Tests for $p_1 - p_2$, Putting It All Together: Two-sample *z* Test for $p_1 - p_2$.	• Calculate the standardized test statistic and *P*-value for a test about a difference between two proportions. • Perform a significance test about a difference between two proportions.	15, 19, 21, 29 **31-33**
4	10.2 The Sampling Distribution of a Difference between Two Means, Confidence Intervals for $\mu_1 - \mu_2$	• Describe the shape, center, and variability of the sampling distribution of $\overline{x}_1 - \overline{x}_2$. • Determine whether the conditions are met for doing inference about a difference between two means. • Construct and interpret a confidence interval for a difference between two means.	37, 39, 41, 45, 49
5	10.2 Significance Tests for $\mu_1 - \mu_2$, Putting It All Together: Two-sample *t* Test for $\mu_1 - \mu_2$.	• Calculate the standardized test statistic and *P*-value for a test about a difference between two means. • Perform a significance test for the difference between two means.	51, 53, 55, 57, 67, **69-72**
6	10.3 Analyzing Paired Data, Confidence Intervals for μ_{diff}. Significance tests for μ_{diff}. Paired Data or Two Samples?	• Analyze the distribution of differences in a paired data set using graphs and summary statistics. • Construct and interpret a confidence interval for a mean difference. • Perform a significance test about a mean difference.	75, 79, 85
7	10.3 "Get Your Heart Beating! Activity, Paired Data or Two Samples?	• Determine when it is appropriate to use paired *t* procedures versus two-sample *t* procedures.	91, 93, **95-97**
8	Chapter 10 Review/ FRAPPY!		Chapter 10 Review Exercises
9	Chapter 10 Test		Cumulative AP® Practice Exam 3

Chapter 11

Day	Topics	**Learning Targets** Students will be able to…	**Suggested Assignment (MC bold)**
1	Activity: The Candy Man Can; 11.1 Stating Hypotheses; Comparing Observed and Expected Counts: The Chi-Square Statistic; The Chi-Square Distributions and *P*-values	• State appropriate hypotheses and compute the expected counts and chi-square statistic for a chi-square test for goodness of fit. • Calculate the chi-square statistic, degrees of freedom, and *P*-value for a chi-square test for goodness of fit.	1, 3, 5, 7
2	11.1 Carrying Out a Test; Follow-Up Analysis	• State and check the Random, 10%, and Large Counts conditions for performing a chi-square test for goodness of fit. • Perform a chi-square test for goodness of fit. • Conduct a follow-up analysis when the results of a chi-square test are statistically significant.	9, 13, **19-21**
3	11.2 Tests for Homogeneity: Stating Hypotheses, Expected Counts and the Chi-Square Test Statistic, Conditions and *P*-values; The Chi-Square Test for Homogeneity	• State appropriate hypotheses and compute the expected counts and chi-square test statistic for a chi-square test based on data in a two-way table. • State and check the Random, 10%, and Large Counts conditions for a chi-square test based on data in a two-way table. • Calculate the degrees of freedom and *P*-value for a chi-square test based on data in a two-way table. • Perform a chi-square test for homogeneity.	27, 29, 31, 33, 35
4	11.2 Relationships Between Two Categorical Variables; The Chi-Square Test for Independence; Using Chi-Square Tests Wisely	• Perform a chi-square test for independence. • Choose the appropriate chi-square test in a given setting.	41, 43, 47, 49, 51, **55-60**
5	Chapter 11 Review/ FRAPPY!		Chapter 11 Review Exercises
6	Chapter 11 Test		

Chapter 12

Day	Topics	Learning Targets Students will be able to …	Suggested Assignment (MC bold)
1	Activity: Sampling from Old Faithful; 12.1 Sampling Distribution of b_1; Conditions for Regression Inference	• Check the conditions for performing inference about the slope β_1 of the population (true) regression line.	1, 3, 5
2	12.1 Estimating the Parameters; Constructing a Confidence Interval for the Slope	• Interpret the values of b_0, b_1, s, and SE_{b_1} in context, and determine these values from computer output. • Construct and interpret a confidence interval for the slope β_1 of the population (true) regression line.	7, 9, 11
3	12.1 Performing a Significance Test for the Slope	• Perform a significance test about the slope β_1 of the population (true) regression line.	15, **23-28**
4	12.2 Transforming with Powers and Roots; Transforming with Logarithms: Power Models	• Use transformations involving powers and roots to find a power model that describes the relationship between two variables, and use the model to make predictions. • Use transformations involving logarithms to find a power model that describes the relationship between two quantitative variables, and use the model to make predictions.	33, 35, 37, 39
5	12.2 Transforming with Logarithms: Exponential Models; Putting it all Together: Which Transformation Should We Choose?	• Use transformations involving logarithms to find an exponential model that describes the relationship between two quantitative variables, and use the model to make predictions. • Determine which of several transformations does a better job of producing a linear relationship.	43, 45, 47, **51-54**
6	Chapter 12 Review/ FRAPPY!		Chapter 12 Review Exercises
7	Chapter 12 Test		Cumulative AP® Practice Test 4

AP EXAM REVIEW (9 DAYS)

- Practice AP Free Response Questions
- Choosing the Correct Inference Procedure
- Flash cards
- Mock Grading Sessions
- Rubric development by student teams
- Practice Multiple Choice Questions