AP Statistics Syllabus (Math Medic)

Course Overview

The AP Statistics course introduces students to the major concepts and tools for collecting, analyzing, and drawing conclusions from data. There are four themes evident in the content, skills, and assessment in the AP Statistics course: exploring data, sampling and experimentation, probability and simulation, and statistical inference. Students use technology, investigations, problem-solving, and writing as they build conceptual understanding.

This course will be taught using an Experience First, Formalize Later (EFFL) learning model, where students work collaboratively to think, to discuss, and to construct their own understanding of new content before the teacher helps students to arrive at formal definitions and formulas.

Course Expectations

Students are expected to fully participate in small groups when working through the activity for each new lesson. Each member of the group should contribute to the discussion in the group, as well as to listen to and critique ideas from others.

During the whole-class debrief of the collaborative activity, students will be asked to share ideas generated in their groups. The teacher will guide the discussion towards a more formal understanding of what was learned in the activity. Students will be expected to record any new learning that results from the class discussion.

At the end of each lesson, students work individually or in small groups to complete the Check Your Understanding questions. These formative assessments reinforce the key ideas of the activity and extend students' thinking to other contexts, representations, or applications.

Students are expected to complete all homework problems to the best of their ability. If they need additional support, they can refer to the additional resources listed below.

Additional Resources

The Math Medic Assessment Platform for AP Statistics provides pre-made homework, quizzes, and tests perfectly aligned to the Math Medic lessons, and covering every topic of the CED (Units 1-9). This resource also allows teachers to edit assessments and build their own assessments from a bank of high-quality questions.

The College Board also provides a plethora of resources to help students learn, practice, and review the content in AP Statistics.

- AP Daily videos are short 5 – 9-minute videos found in AP Classroom that cover all of the content in the AP Statistics course. Students can find fill-in-the-blank notes that go with the videos on blog.mathmedic.com.
- Students looking for more practice can request access to additional questions in AP Classroom.

At the end of the year, students will use the Math Medic AP Statistics Exam Review Course, which includes videos, practice problems, and AP Exam Tips.

Student Practice

The Math Medic Assessment Platform for AP Statistics provides high-quality homework assignments, quizzes, and tests that can be assigned to students digitally or in print. These questions are perfectly aligned to the Math Medic AP Statistics lessons and cover every topic in the CED (Units 1-9). The questions vary in difficulty, feature multiple representations, and give students ample opportunities to practice the Skill Categories outlined for AP Statistics.

Throughout each unit, Topic Questions from AP Classroom will also be provided to help students check their understanding. The Topic Questions are especially useful for confirming understanding of difficult or foundational topics before moving on to new content or skills that build upon prior topics. Topic Questions can be assigned before, during, or after a lesson, and as in-class work or homework. Students will get rationales for each Topic Question that will help them understand why an answer is correct or incorrect, and their results will reveal misunderstandings to help them target the content and skills needed for additional practice.

At the end of each unit or at key points within a unit, Personal Progress Checks will be provided in class or as homework assignments in AP Classroom. Students will get a personal report with feedback on every topic, skill, and question that they can

use to chart their progress, and their results will come with rationales that explain every question's answer.

Textbook Requirement CR1

In lieu of a traditional textbook, we will be using the AP Statistics lessons at portal.mathmedic.com/lesson-plans/course/AP-Statistics, along with the homework, quizzes, and tests available through the Math Medic Assessment Platform for AP Statistics. The Math Medic lessons have been vetted by the College Board and meet the Course Audit curricular requirements.

Technology Requirement | Computer Output CR2

To satisfy Curricular Requirement 2, the Math Medic AP Statistics course provides opportunities for students to interpret standard computer output and use graphing calculators with statistical capabilities to describe data, determine probabilities, and perform tests. For example, in "Lesson 1.4 – Measuring Variability" students learn how to calculate standard deviation on their calculator. "Lesson 3.3 – Making Predictions," students use a graphing calculator to calculate a regression equation and look at computer output to determine how they can determine the equation of the least-squares regression equation. Additionally, in "Lesson 2.5 – Normal Distribution Calculations," students utilize technology to determine probabilities associated with normal distributions. In "Lesson 13.2 – Confidence Intervals for Slope" and "Lesson 13.3 – Significance Tests for Slope" students use computer output to perform inference procedures. These lessons, among others, ensure that students gain proficiency in using technology as an integral tool for statistical analysis.

Course Outline and Pacing CR3

- August/September – Math Medic Unit 1, Unit 2, Unit 3
- October – Math Medic Unit 4, Unit 5
- November – Math Medic Unit 6
- December – Math Medic Unit 7
- January – Math Medic Unit 8, Unit 9
- February – Math Medic Unit 10, Unit 11
- March – Math Medic Unit 12, Unit 13
- April/May – AP Exam Review

Course Outline and Description CR3

All lessons are from the AP Statistics curriculum on Math Medic.

Math Medic AP Statistics Unit 1: Exploring Data

Big Ideas: VAR, UNC

- Lesson 1.0: Can Joy Smell Parkinson's? (CED Topic: 1.1)
- Lesson 1.1: How Are Your Favorite Classes Related? (CED Topics: 1.2 – 1.4, 2.2 – 2.3)
- Lesson 1.2: What Will be the EK Mascot? (CED Topics: 2.1 – 2.2)
- Lesson 1.3: How Many Pairs of Shoes Do You Own? (CED Topics: 1.5 – 1.7)
- Lesson 1.4: Which City Has the Better Weather? (CED Topic: 1.7)
- Lesson 1.5: Where Do I Stand? (CED Topics: 1.7 – 1.9)

Math Medic AP Statistics Unit 2: Modeling Distributions of Data

Big Ideas: VAR, UNC

- Lesson 2.1: Where Do I Stand? Part 2 (CED Topic: 1.7)
- Lesson 2.2: How Did Marty Do On His Test? (CED Topic: 1.10)
- Lesson 2.3: Can You Curve the Test Scores? (CED Topic: 4.9)
- Lesson 2.4: Three Activities (CED Topics: 1.8, 1.10)
- Lesson 2.5: How Long is Your Favorite Song? (CED Topic 1.10)

Math Medic AP Statistics Unit 3: Exploring Two-Variable Data

Big Ideas: VAR, UNC, DAT

- Lesson 3.1: How Many Rubber Bands Does Barbie Need? (CED Topic: 2.4)
- Lesson 3.2: How Safe is Barbie? (CED Topics: 2.5, 2.8)
- Lesson 3.3: How Good Are the Predictions for Barbie? (CED Topics: 2.6 – 2.8)
- Lesson 3.4: Show You Buy Monster Stock? (CED Topic: 2.7)
- Lesson 3.5: How Do Outliers Affect the LSRL? (CED Topic: 2.9)
- Lesson 3.6: Can You Predict Monster Energy Stock Values? (CED Topic: 2.9)
- Lesson 3.7: How Close Can You Get to the Finish Line (CED Topic: 2.9)

Math Medic AP Statistics Unit 4: Collecting Data

Big Ideas: VAR, DAT

- Lesson 4.1: Does Beyonce Write Her Own Lyrics (CED Topics: 3.1 – 3.4)
- Lesson 4.2: How Much Do Fans Love Taylor Swift? Day 1 (CED Topic: 3.3)
- Lesson 4.3: How Much Do Fans Love Taylor Swift? Day 2 (CED Topic: 3.3)
- Lesson 4.4: What is Wrong with These Surveys? (CED Topic: 3.4)
- Lesson 4.5: Does SAT Prep Improve Scores? (CED Topics: 3.2, 3.5)
- Lesson 4.6: What is Wrong with These Experiments? (CED Topic: 3.5)
- Lesson 4.7: Does the Type of SAT Prep Matter? (CED Topics: 3.5 – 3.6)
- Lesson 4.8: What's in a Name? (CED Topic: 3.7)
- Lesson 4.9: Does SAT Prep Improve Scores? Part 2 (CED Topics: 3.2, 3.7)

Math Medic AP Statistics Unit 5: Probability

Big Ideas: VAR, UNC

- Lesson 5.1: Is Mrs. Gallas a Good Free Throw Shooter? (CED Topics: 4.1 – 4.3)
- Lesson 5.2: Are Soda Contests True? (CED Topic: 4.2)
- Lesson 5.3: Matching Starburst (CED Topic: 4.3)
- Lesson 5.4: Taco Tongue, Evil Eyebrow Day 1 (CED Topics: 4.4, 4.6)
- Lesson 5.5: Taco Tongue, Evil Eyebrow Day 2 (CED Topics: 4.5 – 4.6)
- Lesson 5.6: Matching Starburst Part 2 (CED Topic: 4.6)

Math Medic AP Statistics Unit 6: Random Variables

Big Ideas: VAR, UNC

- Lesson 6.1: How Many Children Are in Your Family? (CED Topics: 4.7 – 4.8)
- Lesson 6.2: How Much Do You Get Paid? (CED Topic: 5.2)
- Lesson 6.3: Is It Time For a Raise? (CED Topic: 4.9)
- Lesson 6.4: How Much Will You Make Next Year? (CED Topic: 4.9)
- Lesson 6.5: Will the U.S. Win the World Cup? (CED Topic 4.10)
- Lesson 6.6: Pop Quiz! (CED Topic: 4.11)
- Lesson 6.7: Do You Like Green Skittles? (CED Topic: 6.2)
- Lesson 6.8: how Many Bottle Flips to Go Viral? (CED Topic: 4.12)

Math Medic AP Statistics Unit 7: Sampling Distributions

Big Ideas: VAR, UNC

- Lesson 7.1: AP Stats Exam Scores – Day 1 (CED Topic: 5.1)
- Lesson 7.2: AP Stats Exam Scores – Day 2 (CED Topic: 5.4)
- Lesson 7.3: What's the Proportion of Orange Reese's Pieces (CED Topic: 5.5)
- Lesson 7.4: Do M&M's or Skittles Have More Orange Candies (CED Topic: 5.6)
- Lesson 7.5: How Tall to Be in the NBA? (CED Topic: 5.7)
- Lesson 7.6: How Tall to Be in the NBA? Day 2 (CED Topic: 5.3)
- Lesson 7.7: AP Exam Scores: Which School is Better? (CED Topic: 5.8)

Math Medic AP Statistics Unit 8: Confidence Intervals for Proportions

Big Ideas: VAR, UNC, DAT

- Lesson 8.1: Guess the Mystery Proportion (CED Topics: 6.1, 6.3)
- Lesson 8.2: What Does "95% Confident" Mean? (CED Topic: 6.3)
- Lesson 8.3: Which Way Will the Hershey's Kiss Land? (CED Topic: 6.2)
- Lesson 8.4: What Proportion of Earth is Covered by Water? (CED Topic: 6.2)
- Lesson 8.5: Which Grade is More Likely to Go to Prom? (CED Topics: 6.8 – 6.9)

Math Medic AP Statistics Unit 9: Significance Tests for Proportions

Big Ideas: VAR, UNC, DAT

- Lesson 9.1: Is Mrs. Gallas a Good Free Throw Shooter? (CED Topic: 6.4, 7.1)
- Lesson 9.2: Are You Sure Mrs. Gallas Isn't a Good Free Throw Shooter? (CED Topics: 6.4 – 6.5)
- Lesson 9.3: Can You Taste the Rainbow? (CED Topic: 6.6)
- Lesson 9.4: Red or Black? (CED Topic: 6.10)
- Lesson 9.5: Which Grade is More Likely to Go to Prom? (CED Topic: 6.11)
- Lesson 9.6: Show Rockford Switch to Bottled Water? (CED Topic: 6.7)
- Lesson 9.7: Will Mrs. Gallas Prove Herself? (CED Topic 6.7)

Math Medic AP Statistics Unit 10: Confidence Intervals for Mean

Big Ideas: VAR, UNC, DAT

- Lesson 10.1: How Much Does an Oreo Weigh? (CED Topic: 7.2)
- Lesson 10.2: How Much Screen Time? (CED Topic: 7.2 – 7.3)
- Lesson 10.3: Which Cookie Has the Most Chips? (CED Topic: 7.6 – 7.7)
- Lesson 10.4: Is Climate Change Real? (CED Topic 7.3)

Math Medic AP Statistics Unit 11: Significance Tests for Means

Big Ideas: VAR, UNC, DAT

- Lesson 11.1: How Do AP Exam Scores Compare? (CED Topics: 7.4 – 7.5)
- Lesson 11.2: What is Normal Body Temperature? (CED Topics: 7.4 – 7.5)
- Lesson 11.3: Is One Form of the AP Exam Harder? (CED Topics: 7.8 – 7.9)
- Lesson 11.4: Does a Multivitamin Improve Memory? (CED Topics: 7.8 – 7.9)
- Lesson 11.5: Is Climate Change Real? Part 2 (CED Topic: 7.5)

Math Medic AP Statistics Unit 12: Chi-Square Tests

Big Ideas: VAR, DAT

- Lesson 12.1: What Is Your Favorite Color M&M? Part 1 (CED Topics: 8.1 – 8.2)
- Lesson 12.2: What Is Your Favorite Color M&M? Part 2 (CED Topic: 8.3)
- Lesson 12.3: Will You Get Accepted to College? (CED Topic: 8.4 – 8.6)
- Lesson 12.4: Are Taco Tongue and Evil Eyebrow Independent? (CED Topic: 8.5 – 8.6)

Math Medic AP Statistics Unit 13: Linear Regression Inference

Big Ideas: VAR, UNC, DAT

- Lesson 13.1: Do Absences Affect Your Grade? Part 1 (CED Topics: 9.1 – 9.2)
- Lesson 13.2: Do Absences Affect Your Grade? Part 2 (CED Topics: 9.2 – 9.3)
- Lesson 13.3: Does Studying Improve Test Scores? (CED Topics: 9.4 – 9.5)

Skill Category 1: Selecting Statistical Methods CR4

Skill 1.A: Identify the question to be answered or problem to be solved.

In "Lesson 4.2 – Stratified Random Samples," students are presented with a scenario where the problem to be solved is determining the best method to estimate fan enjoyment at a Taylor Swift concert. Students are then asked questions that require them to identify the question to be answered, such as, "Which method will produce the best estimate for the true population average enjoyment?" The big ideas of DAT and UNC are used. DAT is used because the lesson involves analyzing data to make a decision and UNC is used because the lesson involves understanding the uncertainty associated with different sampling methods.

In "Lesson 4.4 - Potential Problems with Sampling," students are asked to identify what is wrong with different survey methods. For example, in one case fireman is surveying if people support budget cuts to the fire department while walking door to door in his uniform. Students must identify the problem with a survey and then explain the bias.

The big ideas of DAT and UNC are used. DAT is used because the lesson involves recognizing how data collection methods impact conclusions and UNC is used because the lesson involves understanding how bias introduces uncertainty into data.

Skill 1.B: Identify key and relevant information to answer a question or solve a problem.

In "Lesson 4.3 - Cluster and Systematic Samples," students are given a scenario about a hotel manager wanting to survey guests to determine their satisfaction with the view from their rooms. To answer the questions, students must identify key and relevant information such as the number of floors, the number of rooms per floor, and the different views from the rooms. The big ideas of DAT and UNC are used. DAT is used because the lesson involves identifying relevant data to solve a problem and UNC is used because the lesson involves understanding how different sampling methods affect the certainty of conclusions.

In "Lesson 1.3 - Describing Quantitative Data," students analyze a dotplot of University of Michigan football scores. To answer questions about the distribution, students must identify key information like the shape, outliers, center, and variability. The big ideas of VAR and DAT are used. VAR is used because the lesson focuses on understanding variability within the data and DAT is used because the lesson involves using data to describe a distribution.

Skill 1.C: Describe an appropriate method for gathering and representing data.

In "Lesson 4.2 – Stratified Random Samples," students explain the steps involved in taking a simple random sample, a stratified random sample, and a systematic random sample in the context of surveying Taylor Swift fans and which one is most appropriate for the situation. The big ideas of DAT and UNC are used. DAT is used because the lesson involves methods for gathering data to make informed decisions and UNC is used because the lesson involves understanding how the method of data collection impacts the certainty of generalizations.

In "Lesson 1.1 - Analyzing Categorical Data," students learn how to represent categorical data related to student's favorite core class and favorite elective class using bar graphs, segmented bar graphs, and pie charts. Students are asked to describe how these representations are constructed and what type of data is appropriate for each. The big ideas of VAR and DAT are used. VAR is used because the lesson involves representing variability in categorical data and DAT is used because the lesson involves using data representations to analyze relationships and make comparisons.

Skill 1.D: Identify an appropriate inference method for confidence intervals.

In "Lesson 10.1 - Constructing a Confidence Interval for a Mean," students are asked to "Choose the inference procedure and set it up" in the context of estimating average screen time for AP Statistics students. Students in all confidence interval problems are specifically taught to identify the procedure by name, such as "one-sample t-interval for μ" as the appropriate procedure. This activity directly addresses the skill of identifying an appropriate inference method for confidence intervals. The big ideas of UNC are used. UNC is the primary idea here as the lesson focuses on methods for making statistical inferences under conditions of uncertainty.

In "Lesson 8.1 - Interpreting a Confidence Interval," students identify the appropriate inference method by analyzing scenarios involving estimating a population parameter, such as the proportion of adults who pay for unused subscriptions and discussing what the interval means. This helps students build an understanding of the importance of identifying critical aspects about a problem (such as proportion vs. mean). The big ideas of UNC are used. The focus is on understanding the uncertainty inherent in estimating population parameters.

Skill 1.E: Identify an appropriate inference method for significance tests.

In "Lesson 9.1 - Introduction to Significance Tests," students are implicitly working on this skill when determining how to set up a test for a population proportion. The lesson involves a scenario where there is a claim about the true proportion of free throws that someone can make. Like confidence intervals, this lesson stresses to students the importance of thinking about the data being analyzed to choose the correct procedure. The big ideas of UNC are used. This is because the lesson deals with statistical inference and assessing claims under uncertainty.

In "Lesson 11.1 - Introduction to Significance Tests for a Mean," students are implicitly working on this skill when determining how to set up a test for a population mean. The lesson includes scenarios where students must choose the correct test, such as a test to determine if sample data provides convincing evidence that the average AP exam score for East Kentwood is greater than 3.11. Similar to Lesson 9.1, this beginning of unit lesson helps the student understanding the different type of procedure being selected. The big ideas of UNC are used. The focus is on making statistical inferences and decisions in the presence of uncertainty.

Skill 1.F: Identify null and alternative hypotheses.

"Lesson 9.1 - Introduction to Significance Tests" requires students to "State appropriate hypotheses for performing a significance test" in the context of a claim about a true proportion of free throws. The teacher establishes the idea of the null and alternative hypotheses (e.g., Ho: p=0.84, Ha: p>0.84) related to claims about population proportions. The big ideas of UNC are used. This is because hypothesis testing is a key component of statistical inference, which operates under uncertainty.

"Lesson 10.4 – Confidence Intervals for a Mean Difference" also involves stating the null and alternative hypotheses in the context of comparing peak temperatures to determine if climate change is occurring. The big ideas of UNC are used. Formulating hypotheses is a fundamental part of statistical inference and dealing with uncertainty in conclusions.

Skill Category 2: Data Analysis CR5

Skill 2.A: Describe data presented numerically or graphically.

In "Lesson 1.3 - Describing Quantitative Data," students collect data on how many pairs of shoes they own. This data is input into an applet to visualize its transformation into various plots. Students are then asked to describe the data using the plots, focusing on shape, outliers, center, and spread. The big ideas of VAR and DAT are used. VAR is used because the lesson involves describing the variability of quantitative data distributions, and DAT is used because the lesson involves using data visualizations to interpret and describe data.

In "Lesson 3.1 - Scatterplots," students collect data by recording the number of rubber bands attached to a Barbie doll and the resulting bungee jump distance. After creating the scatterplot, they describe the relationship. The class responses are used to formalize the characteristics of the relationship, including direction, form, unusual features, and strength. The big ideas of VAR and DAT are used. VAR is used because the lesson involves describing the variability in the relationship between two quantitative variables, and DAT is used because the lesson involves using scatterplots to represent and interpret data.

Skill 2.B: Construct numerical or graphical representations of distributions.

In "Lesson 1.3 - Describing Quantitative Data," students use class data to construct dotplots, stem-and-leaf plots, and histograms with the help of technology. The lesson emphasizes the development and clarification of these plots. The big ideas of VAR and DAT are used. VAR is used because the lesson involves different ways to visualize the variability in a quantitative data set, and DAT is used because the lesson involves constructing representations of data distributions.

In "Lesson 1.2 - Representing Categorical Data," students are given the percentage of teachers and students who prefer each mascot. They use these percentages to complete segmented bar graphs, observing potential relationships in mascot support. The lesson also addresses the importance of sample size versus percentages that can cause graphical representations to be misleading. The big ideas of VAR and DAT are used. VAR is used because the lesson involves visualizing variability within categorical data, and DAT is used because the lesson involves creating graphical representations of categorical data.

Skill 2.C: Calculate summary statistics, relative positions of points within a distribution, correlation, and predicted response.

In "Lesson 1.4 - Measuring Variability," students analyze weather data for Denver. They complete a table to guide them through calculating standard deviation. The table includes steps such as finding the mean, subtracting the mean from each value, squaring the differences, summing the squares, dividing by the total number, and taking the square root. This process helps students understand standard deviation as the average distance from the mean. The big idea of VAR is used. VAR is used because the lesson specifically focuses on calculating and understanding statistical measures of variability.

In "Lesson 3.6 - Transforming Nonlinear Data," students are asked to use a linear model to predict the stock price for 2014. The big idea of DAT is used. DAT is used because the lesson involves using data-based models for prediction.

In "Lesson 3.2 - Correlation," students are introduced to the concept of correlation through various scatterplot examples. The teacher then instructs students on how to use a calculator to determine the correlation coefficient. The big idea of DAT is used. DAT is used because the lesson involves analyzing patterns in data to quantify relationships between variables.

Skill 2.D: Compare distributions or relative positions of points within a distribution.

In "Lesson 1.5 - Comparing Quantitative Data," students are presented with parallel boxplots showing points scored by the 1997 University of Michigan and Michigan State University football teams. They are required to write a comparison of the distributions, addressing shape, outliers, centers, and spreads. The big ideas of VAR and DAT are used. VAR is used because the lesson involves comparing the variability of different distributions, and DAT is used because the lesson involves analyzing data to make comparisons.

In "Lesson 2.2 - Location in a Distribution," students learn about z-scores using a test scores example. The lesson concludes with a problem where students create a scenario where Lorraine's biology test score is higher than her psychology test score, even though her biology test z-score was lower. The big idea of VAR is used. VAR is used because the lesson involves understanding the relative position of data points within a distribution, a concept related to variability.

Skill Category 3: Using Probability and Simulation CR6

Skill 3.A: Determine relative frequencies, proportions, or probabilities using simulation or calculations.

In "Lesson 5.2 - Simulation," students use simulations to estimate probabilities of events. For example, students use simulations to estimate probabilities of events like determining the likelihood of getting a certain number of "Bankrupt" spins on a Wheel of Fortune. The big idea of UNC is used. UNC is used because the lesson involves using simulation to understand probabilistic outcomes and quantify uncertainty.

In "Lesson 5.3 - Introduction to Probability," students determine relative frequencies, proportions, or probabilities using calculations. For instance, they calculate probabilities for events and their complements, such as calculating the probability of selecting a particular color of Starburst candy. The big idea of UNC is used. UNC is used because the lesson involves quantifying the likelihood of events and understanding randomness.

Skill 3.B: Determine parameters for probability distributions.

In "Lesson 6.6 - Parameters for Binomial Distributions," students calculate and interpret the mean and standard deviation for a binomial distribution. The lesson uses examples such as calculating these parameters (mean and standard deviation) in the context of a student guessing on a multiple-choice quiz. The big idea of VAR is used. VAR is used because the lesson focuses on understanding the variability of binomial distributions through its parameters.

In "Lesson 6.1 - Discrete Random Variables," students determine parameters, specifically the mean and standard deviation, for discrete random variables. The lesson uses data collected by the class, like the number of children in a student's family, to illustrate how to calculate these parameters. The big idea of VAR is used. VAR is used because the lesson involves calculating parameters that describe the variability of discrete random variables.

Skill 3.C: Describe probability distributions.

In "Lesson 6.3 – Transforming Random Variables," students describe probability distributions, focusing on the effects of linear transformations such as adding a constant or multiplying by a constant and how these transformations affect the shape, center, and variability of the distribution. The big idea of VAR is used. VAR is used because the lesson involves seeing how transformations affect the variability of a distribution.

In "Lesson 6.1 – Discrete Random Variables," students describe probability distributions by addressing their shape, outliers, centers, and variability in the context of number of children in a family and the number of Home Alone movies someone has seen. The big idea of VAR is used. VAR is used because the lesson involves describing the shape and characteristics of a specific probability distribution.

Skill 3.D: Construct a confidence interval, provided conditions for inference are met.

In "Lesson 10.1 - Constructing a Confidence Interval for a Mean," students are asked to choose, check, calculate, and conclude all relevant information for a confidence regarding situations such as estimating the average daily phone screen time for AP Statistics students. The big idea of UNC is used. UNC is used because the lesson deals with the uncertainty in estimating population parameters using confidence intervals.

In "Lesson 10.4 - Confidence Intervals for a Mean Difference," students construct confidence intervals for the difference of means in scenarios like comparing actual time spent on the internet vs. parent's perception after checking the appropriate conditions. The big idea of UNC is used. UNC is used because the lesson focuses on quantifying the uncertainty in comparing two population means.

Skill 3.E: Calculate a test statistic and find a p-value, provided conditions for inference are met.

In "Lesson 9.2 - Conditions and p-value," students calculate a test statistic and find a p-value in the context of hypothesis testing. An example includes testing a claim about the proportion of teenagers who can taste a soapy flavor in cilantro. The big idea of UNC is used. UNC is used because the lesson involves using test statistics and p-values to make decisions under uncertainty.

In "Lesson 12.1 – Introduction to Chi-Square Tests," students analyze categorical data, such as M&M colors, and calculate the chi-square test statistic and determine the p-value to assess if the observed distribution fits a claimed distribution. The big idea of UNC is used. UNC is used because the lesson involves assessing the likelihood of observed data under a given hypothesis.

Skill Category 4: Statistical Argumentation CR7

Skill 4.A: Make an appropriate claim or draw an appropriate conclusion.

In "Lesson 9.1 - Introduction to Significance Tests," students are asked to "Interpret a p-value and make a conclusion for a significance test for p." This involves scenarios where students must make conclusion about a claim about a population proportion based on the results of a simulated significance test. For example, students determine if there is convincing evidence a free thrower shooter is not as good as they claim. The big idea of UNC is used. UNC is used because the lesson involves drawing conclusions and making claims under conditions of uncertainty, which is fundamental to significance testing.

In "Lesson 10.4 - Confidence Intervals for a Difference in Proportions," students justify a claim about the difference the difference of two proportions based on a confidence interval. This requires students to analyze a confidence interval and make a claim about whether there is a statistically significant difference between the proportion of juniors

and seniors planning on attending the prom. The big idea of UNC is used. UNC is used because the lesson focuses on using confidence intervals to make claims about population parameters, which inherently involves dealing with uncertainty.

Skill 4.B: Interpret statistical calculations and findings to assign meaning or assess a claim.

In "Lesson 4.2 - Simulation," students are asked to perform a simulation to see if Pepsi's 1 in 6 contest is actually fair after the class finds a lower amount of winners than expected. This involves setting up a simulation to be able to calculate the likelihood of various amounts of winners happening to assess if the game is fair or now. The big idea of UNC is used. UNC is used because the core of probability is to quantify uncertainty.

In "Lesson 11.2 – Significance Tests for a Mean," students investigate a claim as to whether the normal body temperature is 98.6 degrees Fahrenheit. This likely involves tasks where students analyze the results of a hypothesis test and then also reference a confidence interval to make a claim about a population mean. The big idea of UNC is used. This is because interpreting statistical findings involves understanding the uncertainty and likelihood of those findings.

Skill 4.C: Verify that inference procedures apply in a given situation.

In "Lesson 9.3 – Significance Tests for a Proportion," students verify that inference procedures apply as they up a hypothesis test to determine if you can "Taste the Rainbow". This includes checking conditions like randomness, independence, and sample size requirements to ensure the validity of using a z-test for a proportion. The big ideas of UNC and DAT are used. UNC is used because verifying inference procedures involves assessing the uncertainty and assumptions underlying those procedures. DAT is used because this process ensures that data-based conclusions are valid.

In "Lesson 10.2 - Constructing Intervals for a Mean," students verify the conditions for calculating confidence intervals for a population mean to determine how much screen time students typically send on their phone. This involves confirming that conditions such as randomness, normality, and independence are met before constructing a t-interval for a mean. The big ideas of UNC and DAT are used. Similar to the above, UNC is used for assessing uncertainty in the procedure, and DAT is used to ensure the reliability of data-based intervals.

Skill 4.D: Justify a claim based on a confidence interval.

In "Lesson 8.5 - Confidence Intervals for a Difference of Proportions," students justify a claim based on a confidence interval for a difference of population proportions. Students are asked to make a claim about the difference in proportion of students planning to attend prom. The big idea of UNC is used. UNC is used because justifying claims with confidence intervals involves using an interval constructed from sample data to quantify the uncertainty of a population parameter.

In "Lesson 10.1 – Constructing a Confidence Interval for a Mean," students justify a claim that the average weight of an Oreo is 11.33 grams. Students construct a confidence interval to capture the true average weight of an Oreo. The big idea of UNC is used. This is because it involves using confidence intervals, which are tools to make statistical claims under uncertainty.

Skill 4.E: Justify a claim using a decision based on significance tests.

In "Lesson 10.4 - Confidence Intervals for a Difference in Proportions," students justify a claim about the difference the difference of two proportions based on a confidence interval. This requires students to analyze a confidence interval and make a claim about whether there is a statistically significant difference between the proportion of juniors and seniors planning on attending the prom. The big idea of UNC is used. UNC is used because the lesson focuses on using confidence intervals to make claims about population parameters, which inherently involves dealing with uncertainty.

In "Lesson 13.3 – Significance Tests for Slope," includes activities where students justify a claim that studying improves test scores using a significance test. This involves using the results of a significance test to make a claim about the slope of a regression model being a value greater than 0. The big idea of UNC is used. This is because it involves using significance tests, a tool for statistical decision-making under uncertainty.