2023 Advanced Placement® Statistics

About the AP® Statistics Summer Institute
This session is designed for both new and experienced teachers and will cover the material pertinent to the 2023-2024 AP® Statistics Course.

Learning Objectives
- Deepen understanding of statistical concepts and methods, as well as the 4 course skills, described in the AP Statistics Course and Exam Description (CED)
- Refine course planning to meet students' needs given available constraints, resources, and supports.
- Examine effective instructional strategies and assessment resources for AP Statistics.
- Explore uses of AP Classroom to assess and provide feedback about student learning and to aid you in designing instruction.
- Expand professional network as part of the AP Community.

Day 1: July 10, 2023
Session 1
- Introductions
- AP Statistics Overview
- College Board Resources (AP Central, AP Classroom, CED)
- Other AP Statistics Resources
- Use of Technology, Formulas and Tables
- AP Audit, Pacing/Syllabi
- Equity and Access as a Guiding Principle in Designing Instruction

Session 2
- CED Unit 1, Exploring One-Variable Data
- Descriptive Statistics in Words, Numbers, and Charts/Graphs
- Normal Distributions
- Problem Sets on Exploring One-Variable Data
- Exploring One-Variable Data Activity (Census at School)

Session 3
- CED Unit 2, Exploring Two-Variable Data
- Scatterplots and Association
- Correlation and Coefficient of Determination
- Least-Squares Regression Lines
- Residual Plots

Session 4
- Problem Sets on Exploring Two-Variable Data
- Correlation and Regression Methods Activity (Bundesliga Soccer Data)
- In-Class Exercises on Exploring Data and Relationships
- Sample CED Unit 2 Investigative Task
- CED Unit 9, Inference for Quantitative Data: Slopes (reference only)
- Confidence Interval for Regression Slope (reference only)
- Significance Test for Regression Slope (reference only)
- Conditions for Inference (reference only)

Day 2: July 11, 2023
Session 1
- CED Unit 3, Collecting Data
- Sampling
- Observational Studies
- Experiments
- Designing Studies
- Scope of Inference
- Simulation and Simulation-Based Inference

Session 2
- Problem Sets on Collecting Data
- Sampling Activity (Sampling at a School Assembly)
- Experimental Design Activity

Session 3
- CED Unit 4, Probability, Random Variables, and Probability Distributions
- Randomness and Probability Rules
- Conditional Probability
- Mutually Exclusive Events and Independent Events
- Random Variables (Discrete and Continuous)
- Binomial and Geometric Distributions
- Combined Event Probabilities

Session 4
- Problem Sets on Probability, Random Variables, and Probability Distributions
- Probability Activity (Rock-Paper-Scissors)
- Probability Activity (Casino Lab)

Day 3: July 12, 2023
Session 1
- CED Unit 5, Sampling Distributions
- Sample Proportion
- Sampling Distribution of a Sample Proportion
- Sample Mean
- Sampling Distribution of a Sample Mean

Session 2
- Problem Sets on Sampling Distributions
- Sampling Distributions Activity (Reese's Pieces)
- Sampling Distributions Follow-Up Activity (Reese's Pieces)
- Sample CED Unit 5 Investigative Task

Session 3
- CED Unit 6, Inference for Categorical Data: Proportions
- Confidence Interval for a Proportion
- Conditions for Inference
- Margin of Error and Standard Error
- Significance Tests About a Proportion
- Test Statistics and P-Values
- Power, Type I, and Type II Errors
- 2-Proportion Confidence Intervals and Significance Tests for Proportions

Session 4
- Problem Sets on 1-Sample and 2-Sample Inference Procedures for Proportions
- Confidence Interval Activity (Presidential Polls)
- Significance Test Activity (Hershey's Kisses)

Day 4: July 13, 2023
Session 1
- CED Unit 7, Inference for Quantitative Data: Means
- Confidence Interval for a Mean
- T-Distributions and Degrees of Freedom
- Significance Tests About a Mean

Session 2
- 2-Proportion Confidence Intervals and Significance Tests for Means
- Problem Sets on 1-Sample and 2-Sample Inference Procedures for Means
- Confidence Interval and Significance Test Activity for Means (Cereal Box Vouchers)

Session 3
- CED Unit 8, Inference for Categorical Data: Chi-Square
- Chi-Square Distributions
- Conditions for Inference
- Chi-Square Goodness of Fit Test
- Chi-Square Test for Association/Independence
- Chi-Square Test for Homogeneity
- Problem Sets on Chi-Square
- Chi-Square Goodness of Fit Activity (M&M's)
- Strategies and Pedagogical Tools

Session 4
- Instructional Planning Reports PP Slide Deck
- AP Classroom PP Slide Deck (revisited)
- Cumulative Review Practice (Exploring Data, Collecting Data, Probability, Inference)
- AP Reading
- Common Student Errors
- Assessment Strategies
- AP Exam Review Tips
- Projects in AP Statistics
- Equity and Access as a Guiding Principle in Designing Instruction (revisited)
- Wrap-up

What to bring:
Items you should bring during the week include:
- a laptop computer & storage device
- a TI-84 Plus graphing calculator
- a current syllabus and pacing guide (if you have)
- one classroom activity to share (if you have one)
- one best practice to share (if you have one)
- comfortable clothes and shoes for walking in the summer heat
- a light sweatshirt or sweater in case you get chilly in the AC
- note: a Google Form survey will be emailed to you several days before the institute begins – please be sure to provide your preferred email address when registering to help me in final preparations for our APSI

Instructor:

David Wilcox holds the Eileen Mullady Distinguished Teaching Chair at The Lawrenceville School, and in his second year at Lawrenceville received the Robert B Ritter Jr award given by the Head of School for excellence in academic nurturing. David has served as a rubric team member, table leader, and reader for the College Board at the AP Statistics Reading for the past 21 years. He is also an APSI and workshop instructor for the College Board, and has been a presenter at the AP Annual Conference. David recently co-authored "Multiple-Choice and Free-Response Questions in Preparation for the AP Statistics Examination", published by D&S Marketing Systems, Inc. His consulting work includes projects with ETS and Edgenuity, and he serves as a "What's Going on in this Graph" moderator for The New York Times. In addition to AP Statistics, David teaches Honors Calculus-Based Probability and Statistics and develops probability and statistics curriculum for integrated math courses at The Lawrenceville School. David received a Bachelor of Science in Mathematics from Christian Brothers University in 1989, a Masters of International Business Studies (Spanish Track) from the University of South Carolina in 1994, and a Masters of Applied Statistics from the University of South Carolina in 2013.