AP Statistics FRQ Alignment with Curriculum Units

Curriculum Analysis Summary

March 8, 2025

1 Introduction

This document summarizes the alignment between AP Statistics Free Response Questions (FRQs) from the 2018 and 2019 exams and the corresponding curriculum units and directory structure. Understanding these connections can help instructors better prepare students for specific exam content.

2 2018 AP Exam FRQ Analysis

2.1 FRQ 1 (2018)

- **Unit Coverage:** Unit 1 (Exploring One-Variable Data) and Unit 5 (Sampling Distributions)
- **Topics:** Describing histograms and distribution shape; Sampling distribution of the sample mean
- **Relevant Directories:**
  - unit1/1-6: Describing the Distribution of a Quantitative Variable
  - unit1/1-{7,8}: Graphical Representations of Summary Statistics
  - unit5/5-{7,8}: Sampling Distributions for Sample Means
  - unit5/5-{3,4}: Central Limit Theorem (supporting concept)

2.2 FRQ 2 (2018)

- **Unit Coverage:** Unit 3 (Collecting Data)
- **Topics:** Experimental design principles; Randomized block design
- **Relevant Directories:**
  - unit3/3-{6,7}: Selecting an Experimental Design
  - unit3/3-{1,2,3}: Introduction to Planning a Study
  - unit3/3-{4,5}: Introduction to Experimental Design (supporting concept)

2.3 FRQ 3 (2018)

- **Unit Coverage:** Unit 4 (Probability), Unit 5 (Sampling Distributions), and Unit 3 (Collecting Data)
- **Topics:** Basic probability calculation; Sampling distribution of a sample proportion; Stratified random sampling vs. simple random sampling
- **Relevant Directories:**
  - unit4/4-3: Introduction to Probability
  - unit5/5-{5,6}: Sampling Distributions for Sample Proportions
  - unit3/3-{1,2,3}: Random Sampling and Data Collection

2.4   FRQ 4 (2018)

- **Unit Coverage:** Unit 7 (Inference for Quantitative Data: Means)

- **Topics:** Constructing and interpreting a confidence interval for a population mean; Appropriateness of using confidence interval for individual observation

- **Relevant Directories:**

    - unit7/7-{1,2}: Constructing a Confidence Interval for a Population Mean
    - unit7/7-{3,4}: Justifying a Claim About a Population Mean Based on a Confidence Interval

2.5   FRQ 5 (2018)

- **Unit Coverage:** Unit 2 (Exploring Two-Variable Data)

- **Topics:** Interpreting scatterplot; Assessing independence; Extrapolation and regression model limitations

- **Relevant Directories:**

    - unit2/2-3: Representing the Relationship Between Two Quantitative Variables
    - unit2/2-2: Statistics for Two Categorical Variables (for independence concept)
    - unit2/2-4: Linear Regression Models
    - unit2/2-7: Analyzing Departures from Linearity
    - unit2/2-6: Least Squares Regression

2.6   FRQ 6 (2018)

- **Unit Coverage:** Unit 5 (Sampling Distributions), Unit 4 (Probability), and Unit 6 (Inference for Categorical Data)

- **Topics:** Normality condition for sample proportion; Standard error calculation; Combining random variables; Hypothesis testing

- **Relevant Directories:**

    - unit5/5-{5,6}: Sampling Distributions for Sample Proportions
    - unit4/4-{9,10}: Combining Random Variables
    - unit6/6-{3,4}: Setting Up a Test for a Population Proportion
    - unit6/6-{5,6}: Concluding a Test for a Population Proportion

3   2019 AP Exam FRQ Analysis

3.1   FRQ 1 (2019)

- **Unit Coverage:** Unit 1 (Exploring One-Variable Data)

- **Topics:** Identifying outliers; Describing distribution from a stemplot

- **Relevant Directories:**

    - unit1/1-6: Summary Statistics for a Quantitative Variable; Describing the Distribution of a Quantitative Variable
    - unit1/1-{7,8}: Graphical Representations of Summary Statistics

3.2   FRQ 2 (2019)

- **Unit Coverage:** Unit 9 (Inference for Quantitative Data: Slopes)

- **Topics:** Constructing and interpreting a confidence interval for the slope; Using confidence interval to justify a claim about the slope

- **Relevant Directories:**

    - unit9/9-{1,2}: Confidence Intervals for the Slope of a Regression Model
    - unit9/9-{3,4}: Justifying a Claim About the Slope of a Regression Model Based on a Confidence Interval

3.3   FRQ 3 (2019)

- **Unit Coverage:** Unit 1 (Exploring One-Variable Data)

- **Topics:** Reading and interpreting histograms; Comparing distributions; Estimating median from histograms

- **Relevant Directories:**

    - unit1/1-{7,8}: Graphical Representations of Summary Statistics
    - unit1/1-6: Describing the Distribution of a Quantitative Variable
    - unit1/1-9: Comparing Distributions of a Quantitative Variable

3.4   FRQ 4 (2019)

- **Unit Coverage:** Unit 3 (Collecting Data)

- **Topics:** Advantages of randomized block design; Identifying blocks; Describing randomization

- **Relevant Directories:**

    - unit3/3-{6,7}: Selecting an Experimental Design
    - unit3/3-{4,5}: Introduction to Experimental Design (supporting concept)

3.5   FRQ 5 (2019)

- **Unit Coverage:** Unit 4 (Probability) and Unit 5 (Sampling Distributions)

- **Topics:** Binomial probability calculation; Geometric probability calculation; Normality of sampling distribution of sample proportion

- **Relevant Directories:**

    - unit4/4-{9,10}: Introduction to the Binomial Distribution
    - unit4/4-12: The Geometric Distribution; Parameters for a Binomial Distribution
    - unit5/5-{5,6}: Sampling Distributions for Sample Proportions

3.6 FRQ 6 (2019)

- **Unit Coverage:** Unit 7 (Inference for Quantitative Data: Means) and Unit 1 (Exploring One-Variable Data)

- **Topics:** Non-parametric test (Wilcoxon Rank Sum Test); Distribution shape; Properties of median vs. mean

- **Note:** This FRQ tests beyond the standard curriculum with a non-parametric test

- **Relevant Directories (conceptually related):**

  - unit7/7-{1,2}, unit7/7-{3,4}, unit7/7-{5,6}, unit7/7-{9,10}: General inference framework concepts
  - unit1/1-6: Distribution shape and summary statistics

4 Summary and Patterns

Unit	2018 FRQs	2019 FRQs
Unit 1	FRQ 1	FRQ 1, FRQ 3, FRQ 6 (partially)
Unit 2	FRQ 5	–
Unit 3	FRQ 2, FRQ 3 (partially)	FRQ 4
Unit 4	FRQ 3 (partially), FRQ 6 (partially)	FRQ 5 (partially)
Unit 5	FRQ 1 (partially), FRQ 6 (partially)	FRQ 5 (partially)
Unit 6	FRQ 6 (partially)	–
Unit 7	FRQ 4	FRQ 6 (conceptually)
Unit 8	–	–
Unit 9	–	FRQ 2

5 Instructional Implications

Based on the analysis of the 2018 and 2019 AP Statistics FRQs, instructors should consider the following emphases in their teaching:

1. **Unit 1 (Exploring One-Variable Data)** appears consistently across multiple FRQs in both years, indicating its fundamental importance.

2. **Unit 3 (Collecting Data)** with emphasis on experimental design appears regularly, particularly for questions about research methodology.

3. **Units 4 and 5 (Probability and Sampling Distributions)** are often tested together, showing the conceptual relationship between probability theory and sampling distributions.

4. **Inference topics (Units 6, 7, and 9)** appear across various questions, but often test different specific inference procedures.

5. Note that **Unit 8 (Chi-Square Tests)** didn't appear in either 2018 or 2019 FRQs in this analysis, but students should still be prepared for this content.

6. **Unit 2 (Exploring Two-Variable Data)** appeared only once in 2018 FRQ 5, but the instructor noted this was particularly significant for upcoming class coverage.

6 Conclusion

The AP Statistics FRQs from 2018 and 2019 cover material from all nine curriculum units with particular emphasis on data exploration, experimental design, and various inference procedures. The alignment between FRQs and directory structure provides a valuable roadmap for instructors to ensure comprehensive coverage of exam-relevant material. The presence of material beyond the standard curriculum (Wilcoxon Rank Sum Test in 2019 FRQ 6) also suggests the value of exposing students to extensions of core concepts when time permits.