

Board Meeting

Monday, October 5, 2026 6:30 PM

Educational Service Center, 775 Marion Road, York, PA 17406

1. Call to Order	Speaker (s) : Board President
2. Pledge of Allegiance to the Flag	Speaker (s) : Board President
3. Roll Call	Speaker (s) : Board Secretary
4. Approval of Board Agenda	Speaker (s) : Board President
5. Recognition	
5.A. Student of the Month – Elementary Schools	Speaker (s) : Administration
6. Citizen Comment	Speaker (s) : Board President
7. Discussion Items	
7.A. Adoption of Policies – First Read	Speaker (s) : Committee Chair & Assistant Superintendent
7.B. Adoption of Policies – Second Read	Speaker (s) : Committee Chair & Assistant Superintendent
7.C. AP Statistics Curriculum Maps	Speaker (s) : Committee Chair & Assistant Superintendent
7.D. Field Trip Requests	Speaker (s) : Assistant Superintendent
7.E. 2026 Boys and Girls Lacrosse Clinic	Speaker (s) : Assistant Superintendent
8. Action Items	Speaker (s) : Board President
8.A. Co-Curricular	
8.A.1. Athletic Co-Curricular Appointments	
8.A.2. Non-Athletic Co-Curricular Appointments	
8.B. Personnel	
8.B.1. Conferences and Workshops	
8.B.2. Employment	
8.B.3. Resignations	
8.B.4. Corrections	
8.B.5. Tenure	
8.C. Executive and Finance	

8.C.1. PSBA Compensation Study Proposal

8.C.2. Sponsorship Agreements

8.D. Policy

8.D.1. Adoption of Policies – Final Adoption

9. Board Representative Reports

9.A. Legislative Committee – Silvagnoli

Speaker (s) : Director
Silvagnoli

10. Agenda Review

Speaker (s) :
Superintendent

11. Citizen Comment

Speaker (s) : Board
President

12. Board Comment

Speaker (s) : Board
Directors

13. Adjournment

Speaker (s) : Board
President



BOARD POLICY

614 Payroll Authorization Draft 2

9.30.26

POLICY NUMBER	ADOPTED	VERSION	DOCUMENT STATUS
614	7/11/2011	v1.3	DRAFT
PRINTED			
10/1/2026			

■ Proposed addition ■ Proposed deletion

Purpose

The Board directs that employees hired and retained by the District be paid promptly, accurately, and according to the terms under which they were approved.

Authority

Employment of all permanent, temporary and part-time district personnel must be approved by the Board. The Board shall authorize payment of salaries to employees. Actions by the Board to employ staff on a contractual basis shall ~~may~~ include the name of the individual, position title, salary/position classification, and period of employment. ~~position classification, method of payment, and budget category to which the wages are to be charged.~~ [1] [2] [3] [4] [5] [6] [7] [8]

Actions by the Board to employ temporary or part-time personnel may include the name of the individual, position title, rate of pay, position classification, the maximum number of hours or days an employee may work, school or vocation assignment, and budget category to which wages are to be charged.

The minutes of Board meetings shall record all actions with regard to resignation, retirement, death or discharge of all employees, or nonretention of a temporary professional employee. Each action shall include the name of the employee, date

upon which salary or wages will terminate, and position formerly held.

Guidelines

Time reporting procedures adequate to meet wage and hour requirements and Board policy **shall may** be required of **all- designated** employees **in accordance with applicable individual contracts and collective bargaining agreements.**

Salary or wages may be withheld for unapproved time off, in accordance with established procedures, by the Superintendent.

Overtime can be scheduled and paid only when authorized in advance by the immediate supervisor. [\[9\]](#)

The payroll shall be certified by the **Chief Financial Officer** ~~Business Manager.~~

Legal Footnotes

[1] Pol. 302 — Employment of Superintendent/Assistant Superintendent
POLICY REFERENCE

[2] Pol. 304 — Employment of Administrators
POLICY REFERENCE

[3] Pol. 304.1 — Employment of Professional Employees
POLICY REFERENCE

[4] Pol. 304.2 — Employment of Support Employees
POLICY REFERENCE

[5] Pol. 305 — Employment of Substitutes
POLICY REFERENCE

[6] Pol. 306 — Employment of Summer School Staff
POLICY REFERENCE

[7] Pol. 308 — Employment Contract/Board Resolution
POLICY REFERENCE

[8] Pol. 328 — Compensation Plans/Salary Schedules
POLICY REFERENCE

[9] Pol. 330 — Overtime
POLICY REFERENCE

Legal References

No additional references listed.



BOARD POLICY

800 Records Management Draft 3

9.18.26

POLICY NUMBER	VERSION	DOCUMENT STATUS	PRINTED
800	v1.6	DRAFT	9/18/2026

■ Proposed addition ■ Proposed deletion

Purpose

It is the policy of this school district to generate and retain only those records and data which are required for the effective operation of the district and to meet the obligations to students, parents/guardians, employees, and state, local and federal governments.

The Board recognizes the importance of establishing and maintaining a Records Management Plan that defines district staff responsibilities, complies with federal and state laws and regulations, and improves efficiency by reducing the time spent retrieving required information from duplicate and other unnecessary records and data.

A Records Management plan will provide better access, control, and retrieval of information resources within the district; preserve storage space; optimize network performance; make complying with litigation requirements more efficient; and ultimately lower the district's overall information management costs.

Authority

The Board shall retain, as a permanent record of the district, Board minutes, annual auditor's reports and annual financial reports. All other financial records, including financial account books, orders, bills, contracts, invoices, receipts and purchase orders, shall be retained by the district for a period of not less than six (6) years.[1]

All other district records shall be retained in accordance with state and federal law and regulations and the district Records Management Plan approved by the Board.

The district shall make a good faith effort to comply with all proper requests for record production. Selective Destruction of records in anticipation of litigation is forbidden.[2] [3]

Definitions

Electronic Mail (E-mail) System - a system that enables users to compose, transmit, receive and manage text and/or graphic electronic messages and images across local area networks and through gateways connecting other networks. This information consists primarily of messages but may include attachments such as calendars, directories, distribution lists, word processing documents, spreadsheets, and other electronic documents.

Electronic Records - include numeric, graphic, and text information, which may be recorded, on any medium capable of being read by a computer and which satisfies the definition of a record. Electronic records include, but are not limited to: magnetic media such as computer tapes, disks, optical disks, diskettes and other electronic storage devices and electronic filing systems containing records. This also includes data stored in the cloud and District-wide network systems.

Litigation Hold - a communication ordering that all records and data relating to an issue being addressed by current or potential litigation or investigation be preserved for possible production during the litigation or investigation.

Records - information, regardless of physical form or characteristics, that documents a transaction or activity of the district and that is created, received or retained pursuant to law or in connection with a transaction, business or activity of

the district. The term includes a document, paper, letter, map, book, tape, photograph, film, **video, images** or sound recording, information stored or maintained electronically and a data-processed or image-processed document.[\[4\]](#)

Records Management Plan - the system implemented by the district for the retention, retrieval, and disposition of all records generated by district operations.

Records Retention Schedule - a comprehensive listing stating retention periods and proper disposition of records.

Delegation of Responsibility

Any individual responsible for the collection, maintenance, and/or security of records on behalf of the District shall comply with State and federal laws and regulations, Board policies, District procedures and the Records Management Plan.

Records Coordinator

In order to maintain a Records Management Plan that complies with federal and state laws and regulations and Board policy, the Board designates the Superintendent or designee as the district's Records Coordinator who shall serve as the chairperson of the Records Management Committee.

The Records Coordinator shall be responsible to:

1. Ensure that training appropriate to the user's position and level of responsibility is provided. Such training may include:
 - a. A review of this policy, administrative regulations and Records Management Plan.
 - b. Operation, care and handling of the equipment and software.
 - c. Requirements of the Records Retention Schedule.
 - d. Protocols for preserving and categorizing district records.
 - e. Procedures and responsibilities of district staff in the event of a litigation hold.
 - f. Identification of what is and what is not a record.
 - g. Disposal of records.
2. Review the Records Management Plan **annually periodically** to ensure that record descriptions and retention periods are updated as necessary.
3. Monitor changing technology and legal developments to recommend revisions to the Records Management Plan and/or district operations.
4. Identify, when the retention period expires, the specific records to be disposed of and ensure that all identified records are properly disposed of at regular intervals of at least once every twelve (12) months.

Records Management Committee

A committee responsible for the development and recommendation of the district's Records Management Plan shall be established by the Board. The Records Management Committee shall give primary consideration to the most efficient and economical means of implementing the recommended Plan. **The Committee shall consult with the district solicitor as it deems necessary.** Members of the Committee shall include the:

1. Open Records Officer. **[5]**
2. Superintendent, **if not Records Coordinator.**

3. Board Secretary.[\[6\]](#)
4. ~~District solicitor~~
5. Director of Communications
6. Information Technology Director or designee.
7. ~~Business Manager~~Chief Financial Officer.
8. Board member(s).
9. Records Management Coordinator.
10. Human Resources Director.
11. Other persons as assigned.

The Records Management Committee shall meet ~~at least annually periodically~~ to evaluate the effectiveness and implementation of the Records Management Plan and recommend changes as needed.

Guidelines

Records Management Plan

The district's Records Management Plan shall be the principal means for the ~~storage,~~ retention, retrieval, and disposition of manual and electronic records, ~~including e-mails.~~ The Plan shall not rely primarily on backup systems to manage the retention and disposition of records.

The Records Management Plan, ~~as outlined in the administration regulations,~~ shall include:

1. Comprehensive listing of records and data of the district.
2. Criteria to distinguish records of the school district from the supplemental personal records of individual employees.[\[10\]](#) [\[11\]](#)
3. System(s) of records storage and retrieval to be used, including in what form the records will be stored, maintained, reproduced, and disposed.

4. Preservation measures to protect the integrity of records and data.
5. ~~Data map or flow chart detailing the sources, routes, and destinations of electronic records.~~
6. Procedures and employee designated for determining whether an item is a record.
7. Procedures for adding, revising or deleting records and data, and any other details necessary to implement the Records Management Plan.
8. Records Retention Schedule.
9. Provisions for the storage and retrieval of records in the event of an emergency or disaster.
10. Staff positions authorized to access district records.
11. Procedures to be implemented in the event of a litigation hold that immediately suspends disposition of all records relevant to the current or potential claim. Such procedures shall specify:
 - a. Who can initiate a litigation hold.
 - b. How and to whom a litigation hold is communicated.
 - c. Who will determine which records are subject to the litigation hold.
 - d. Who will be responsible for collecting and preserving such records and data.
 - e. Who will be responsible for monitoring and ensuring the district's compliance with the litigation hold.
 - f. In what format the records will be collected.

When possible, records and data shall be stored in their original form, including metadata, such as creation date, author, type of file, etc.

For any record not covered by the Records Retention Schedule, the Records Management Committee shall determine how long the record shall be kept and recommend any necessary revisions to the retention schedule.

The district shall maintain and dispose of records in a manner that protects any sensitive, proprietary or confidential information or individual privacy rights, and helps conserve natural resources.

Manual Records

Manual records, which include all records not stored electronically, shall be retained and disposed of in accordance with the Records Management Plan.

Manual records shall be indexed in an organized and consistent manner, reflecting the way the records will be retained and referenced for later retrieval.

~~The district shall develop and maintain adequate and up-to-date documentation about each manual record system. Documentation may:~~

- ~~1. List system title and responsible employee(s) or office.~~
- ~~2. Define the contents of the system, including record formats.~~
- ~~3. Identify vital records and information.~~
- ~~4. Determine restrictions on access and use.~~

Electronic Records

It is the policy of this district to retain only those electronic records minimally necessary for student instruction and district business in accordance with the Record Retention Schedule. As such, all district personnel are directed to create and retain only those electronic records necessary for student instruction and district business on the district's information network.

Electronic records shall be retained and disposed of in the same manner as records in other formats and in accordance with the Records Management Plan.

Electronic records shall be indexed in an organized and consistent manner, reflecting the way the records will be retained and referenced for later retrieval.

~~The district shall develop and maintain adequate and up to date documentation about each electronic record system. Documentation may:~~

- ~~1. List system title and responsible employee(s) or office.~~
- ~~2. Specify all technical characteristics necessary for reading or processing the records stored on the system.~~
- ~~3. Identify all defined inputs and outputs of the system.~~
- ~~4. Define the contents of the system, including record formats and database tables.~~
- ~~5. Identify vital records and information.~~
- ~~6. Determine restrictions on access and use.~~
- ~~7. Describe update cycles or conditions.~~

E-mail Records

All e-mails sent or received by district e-mail users shall be archived for a minimum period of three (3) years.

E-mail messages, in and of themselves, do not constitute records. Retention and disposition of e-mail messages depend on the function and content of the individual message.

Records on an e-mail system, including messages and attachments, shall be retained and disposed of in accordance with the district's Records Management Plan.

~~E-mail records may be maintained as an electronic record or be printed and maintained as a manual record.~~

~~For each e-mail considered to be a record, the following information shall be retained:~~

- ~~1. Message content.~~
- ~~2. Name of sender.~~
- ~~3. Name of recipient.~~
- ~~4. Date and time of transmission and/or receipt.~~

Contractors Service Providers

~~Records created or maintained by contractors employed by the Board shall be retained and disposed of in accordance with the Records Management Plan. The Board requires- prefers and seeks contractors that will follow with the District guidelines to create, maintain, retain, and dispose of district records in accordance with the Records Management Plan. However, in the absence of this, the Board expects compliance within the terms of its agreement.~~^[8]

Exceptions

This policy shall not apply to:

1. Student records. Student records are managed under the district's Student Records Plan and Board policy. ^[9]
2. Items that do not meet the definition of a record, which shall not be subject to retention.

Legal Footnotes

[1] 24 P.S. 518
LEGAL REFERENCE

[2] 65 P.S. 67.901
LEGAL REFERENCE

[3] Pol. 828 — Fraud
POLICY REFERENCE

[4] 65 P.S. 67.102
LEGAL REFERENCE

[5] Pol. 801 — Public Records
POLICY REFERENCE

[6] 24 P.S. 433
LEGAL REFERENCE

[8] 65 P.S. 67.506
LEGAL REFERENCE

[9] Pol. 216 — Student Records
POLICY REFERENCE

[10] 20 U.S.C. 1232g
LEGAL REFERENCE

[11] 65 P.S. 67.708
LEGAL REFERENCE

Legal References

No additional references listed.



Central York School District

AP Statistics

Overview

Grade Level: 9 – 12

Course Description:

The AP Statistics course introduces students to the major concepts and tools for collecting, analyzing, and drawing conclusions from data. There are four Statistical Practices along with their concomitant skills: formulate questions, collect data, analyze data, and interpret results. The course content includes analyzing one-variable data, collecting data, probability, random variables and probability distributions, statistical inference for proportions and differences in proportions, statistical inference for two-way tables, and statistical inference for proportions and differences in means. Students use technology, investigations, problem solving, and writing as they build conceptual understanding.

Course Big Ideas:

- **BIG IDEA 1: VARIATION AND DISTRIBUTION**
The distribution of measures for individuals within a sample or population describes variation. The value of a statistic varies from sample to sample. How can we determine whether differences between measures represent random variation or meaningful distinctions? Statistical methods based on probabilistic reasoning provide the basis for shared understandings about variation and about the likelihood that variation between and among measures, samples, and populations is random or meaningful.
- **BIG IDEA 2: PATTERNS AND UNCERTAINTY**
Statistical tools allow us to represent and describe patterns in data and to classify departures from patterns. Simulation and probabilistic reasoning allow us to anticipate patterns in data and to determine the likelihood of errors in inference.
- **BIG IDEA 3: DATA-BASED PREDICTIONS, DECISIONS, AND CONCLUSIONS**
Data-based regression models describe relationships between variables and are a tool for making predictions for values of a response variable. Collecting data using random sampling or randomized experimental design means that findings may be generalized to the part of the population from which the selection was made. Statistical inference allows us to make data-based decisions.

Course Essential Questions:

- How can we reason in the face of uncertainty and chance?
- What story does data tell?
- What procedures generate meaningful data?
- How can we anticipate patterns in randomness?
- How can we make inferences about large populations from samples drawn out of those populations?
- When can we conclude that one variable causes changes in another variable?

Course Competencies:

- Write an appropriate investigative question.
- Describe one-variable data numerically and graphically.
- Describe two-variable data numerically and graphically.
- Identify proper and improper methods for selecting a sample.
- Design a proper experiment.
- Compute probabilities of random events using simulation and/or mathematics.
- Describe distributions of random variables.
- Describe how sample statistics vary in random sampling.
- Construct and interpret confidence intervals to estimate population parameters.
- Perform significance tests to test claims about population parameters.

Course Assessments:

- Unit quizzes
- Unit tests
- Informal and formal writing assignments
- Presentations
- Informal check of daily assignments



Central York School District

AP Statistics

Grade Level: 9 – 12

Unit 1 Part 1: Exploring One-Variable Data

Time: 11 days

Standards:

College Board 2026 CED for AP Statistics

- 1.1.A Identify components within a statistical study.
- 1.1.B Determine an investigative question within a statistical study.
- 1.2.A Identify observational units, variables, parameters, and statistics from a statistical study or data set.
- 1.2.B Identify types of variables.
- 1.2.C Identify types of quantitative variables.
- 1.3.A Construct categorical one-variable tabular representations.
- 1.3.B Describe categorical one-variable tabular representations with summary statistics.
- 1.4.A Construct categorical one-variable graphical representations.
- 1.4.B Justify a claim using categorical one-variable graphical representations.
- 1.4.C Compare multiple categorical one-variable tabular and graphical representations.
- 1.5.A Construct quantitative one-variable graphical representations.
- 1.6.A Describe distributions of quantitative one-variable graphical representations.
- 1.6.B Justify a claim using distributions of quantitative one-variable graphical representations.
- 1.7.A Calculate measures of center and position for quantitative data.
- 1.7.B Calculate measures of variability for quantitative data.
- 1.7.C Calculate different units of measurement for summary statistics.
- 1.7.D Calculate outliers for quantitative data.
- 1.7.E Compare multiple quantitative one-variable summary statistics.
- 1.7.F Justify the selection of a summary statistic for describing quantitative data.
- 1.8.A Construct quantitative one-variable graphical representations of summary statistics.
- 1.8.B Describe quantitative one-variable graphical representations of summary statistics based on the relationship of the mean and the median.
- 1.9.A Compare multiple quantitative one-variable graphical representations.
- 1.9.B Compare multiple quantitative one-variable graphical representations of summary statistics.
- 1.9.C Justify a claim using multiple quantitative one-variable graphical representations.
- 1.9.D Calculate z-scores with population parameters.
- 1.9.E Compare z-scores as measures of relative position for distributions.

Know:

- A statistical study is a study in which data are collected from a sample to answer an investigative question about a larger population.
- A population consists of all items or individuals of interest.
- A sample is a subset of the population from which data are obtained.
- An observational unit is an item or individual from which information is collected.
- A variable is a characteristic that can change from one individual to another.
- Variables can be classified as categorical or quantitative.
- A parameter is a numerical attribute or summary of the variable of interest for a population.
- A statistic is a numerical attribute or summary of the variable of interest for a sample.
- A discrete variable can take on a countable number of values.

- A continuous variable can take on infinitely many values.
- Percentages, relative frequencies, and rates all provide the same information as proportions.
- Outliers for one-variable data are data points that are unusually small or large relative to the rest of the data.
- A distribution is skewed to the right (positive skew) if the right tail is longer than the left.
- A distribution is skewed to the left (negative skew) if the left tail is longer than the right.
- A distribution is symmetric if the left half is the mirror image of the right half.
- One-variable graphs with one main peak are known as unimodal.
- A gap is a region of a distribution between two data values where there are no observed data.
- Clusters are concentrations of data usually separated by gaps.
- The mean is the sum of all the data values divided by the number of values.
- The median of a data set is the middle value when data are ordered.
- The first quartile, Q1, is the median of the half of the ordered data set from the minimum to the position of the median.
- The third quartile, Q3, is the median of the half of the ordered data set from the position of the median to the maximum.
- Range = maximum – minimum.
- The interquartile range (IQR) = $Q3 - Q1$.
- Standard deviation s is a way to measure variability of the distribution of a quantitative variable.
- The sample variance is the square of the sample standard deviation, s^2 .
- If a distribution is relatively symmetric, then the mean and median are relatively close to one another.
- If a distribution is skewed right, then the mean is usually greater than the median.
- If a distribution is skewed left, then the mean is usually less than the median.
- The mean, standard deviation, and range are not resistant.
- The median and IQR are considered resistant.
- The five-number summary is the minimum data value, the first quartile (Q1), the median, the third quartile (Q3), and the maximum data value.
- A boxplot is a graphical representation of the five-number summary.

Understanding/Key Learning:

- Given that variation may be random or not, conclusions are uncertain.
- Graphical representations and numerical summaries allow us to identify and represent key features of data.
- Claims may be justified (or not) by examining data, including graphical representations and summary statistics.

Do:

- Summarize the distribution of data with a frequency table and/or a relative frequency table.
- Display the distribution of categorical data with a bar chart (or bar graph) of frequencies (counts) or relative frequencies.
- Justify claims about data in context using counts and relative frequencies of categorical data.
- Compare two or more data sets in terms of the same categorical variable using frequency tables, bar graphs, or other representations.
- Display the distribution of a quantitative data with a dotplot, a stem and leaf plot, and/or a histogram.
- Describe the distribution of quantitative data: shape, center, and variability (spread), as well as any unusual features.
- Compute the mean and the median of quantitative data to measure the center of the values.
- Compute the range, interquartile range (IQR), and standard deviation of quantitative data to measure the variability of the values.
- Calculate and interpret the percentile for a value.
- Determine how changing units of measurement affects the values of calculated statistics.
- Determine outliers in quantitative data using the $1.5 \times \text{IQR}$ rule.
- Determine outliers in quantitative data using the 2 standard deviations rule.
- Display the distribution of quantitative data with a boxplot.

- Summary statistics of quantitative data, or of sets of quantitative data, can be used to justify claims about the data in context.
- Compare two or more independent samples on center, variability, clusters, gaps, outliers, and other features using graphs.
- Compare two or more independent samples using numerical summaries.
- Calculate and interpret a z-score (one type of standardized score) for a value in a set of quantitative data.
- Find the proportion of data values located on a given interval of a normally distributed random variable using technology, such as a calculator, a standard normal table, or computer-generated output.
- Use technology to estimate parameters for some populations given the area of a region under the graph of the normal distribution curve.
- Compare relative positions of points within a data set or between data sets using percentiles and/or z-scores.

Unit Essential Questions:

- How can I represent data visually and numerically?
- How do I describe distributions of data?
- How can I compare two groups of data for the same variable?
- Where do values fall, relative to other values?

Lesson Essential Questions:

- What are the two types of variables?
- How can we summarize the distribution of a categorical variable?
- How can we visualize the distribution of a categorical variable?
- How can we visualize the distribution of a quantitative variable?
- How can we describe the distribution of a quantitative variable?
- What is the center of the distribution of a quantitative variable?
- How much do the values of a quantitative variable vary?
- How are the distributions of these variables different and the same?
- Where is the relative location of a value in a distribution?

Materials/Resources:

Textbook

Graphing calculator

Online statistical applets (e.g. <https://www.stapplet.com/>)

Vocabulary:

Data	Distribution	Statistic	Parameter
Observational	Bar graph	Mean	Standardized score
UnitVariability	Dotplot	Median	Z-score
Categorical variable	Histogram	Standard deviation	
Quantitative variable	Stemplot	Range	
Discrete variable	Boxplot	Interquartile range (IQR)	
Continuous variable	Skewed left	Outliers	
	Skewed right		
	Symmetric		
	Unimodal		

Assessments:

Unit quizzes

Unit tests

Informal and formal writing assignments

Presentations

Informal check of daily assignments

Progress check (College Board)



Central York School District

AP Statistics

Grade Level: 9 – 12

Unit 1 Part 2: Collecting Data

Time: 8 days

Standards:

College Board 2026 CED for AP Statistics

- 1.10.A Determine the components of an investigative question within a statistical study.
- 1.10.B Identify a census.
- 1.10.C Identify an experiment.
- 1.10.D Identify an observational study.
- 1.10.E Justify the appropriateness of generalizations for a statistical study.
- 1.11.A Identify a sampling method given a description of a study.
- 1.11.B Justify the appropriateness of a sampling method.
- 1.12.A Identify potential sources of bias in sampling methods.
- 1.13.A Identify elements of a well-designed experiment.
- 1.13.B Identify experimental designs.
- 1.13.C Justify the appropriateness of a particular experimental design.
- 1.13.D Justify the appropriateness of the conclusions based on a well-designed experiment.

Know:

- An investigative question should be posed so that the required data can be collected and analyzed.
- Methods for data collection that do not rely on chance result in untrustworthy conclusions.
- A population consists of all items or subjects of interest.
- A sample selected for study is a subset of the population.
- In an observational study, treatments are not imposed.
- In a retrospective study, investigators examine data for a sample of individuals.
- In a prospective study, investigators follow a sample of individuals into the future, collecting data.
- A sample survey collects data from a sample in an attempt to learn about the population from which the sample was taken.
- In an experiment, different conditions (treatments) are assigned to experimental units (participants or subjects).
- It is only appropriate to make generalizations about a population based on samples that are randomly selected or otherwise representative of that population.
- A sample is only generalizable to the population from which the sample was selected.
- It is not possible to determine causal relationships between variables using data collected in an observational study.
- When an item from a population can be selected only once, this is called sampling without replacement.
- When an item from the population can be selected more than once, this is called sampling with replacement.
- A simple random sample (SRS) is a sample in which every group of a given size has an equal chance of being chosen.
- A stratified random sample involves the division of a population into separate groups, called strata, based on shared attributes or characteristics (homogeneous grouping).
- A cluster sample involves the division of a population into smaller groups, called clusters.
- A systematic random sample is a method in which sample members from a population are selected according to a random starting point and a fixed, periodic interval.

- A census selects all items/subjects in a population.
- There are advantages and disadvantages for each sampling method depending upon the question that is to be answered and the population from which the sample will be drawn.
- Bias occurs when certain responses are systematically favored over others.
- Voluntary response bias may occur when a sample consists of volunteers or people who choose to participate.
- Undercoverage bias may occur when part of the population has a reduced chance of being included in the sample.
- Nonresponse bias may occur when individuals chosen for the sample for whom data cannot be obtained differ from those for whom data can be obtained.
- Problems in the data gathering instrument or process result in response bias.
- Non-random sampling methods introduce potential for bias because they do not use chance to select the individuals.
- The experimental units are the individuals that are assigned treatments.
- An explanatory variable (or factor) in an experiment is a variable whose levels are manipulated intentionally.
- The levels or combination of levels of the explanatory variable(s) are called treatments.
- A response variable in an experiment is an outcome from the experimental units that is measured after the treatments have been administered.
- A confounding variable in an experiment is a variable that is related to the explanatory variable and influences the response variable.
- A confounding variable may create a false perception of association between explanatory and response variables.
- A well-designed experiment should include the following: comparison, random assignment/allocation of treatments, replication, and control.
- There are advantages and disadvantages for each experimental design.
- In a completely randomized design, treatments are assigned to experimental units completely at random.
- Random assignment tends to balance the effects of uncontrolled (confounding) variables so that differences in responses can be attributed to the treatments.
- In a single-blind experiment, subjects do not know which treatment they are receiving, but members of the research team do, or vice versa.
- In a double-blind experiment neither the subjects nor the members of the research team who interact with them know which treatment a subject is receiving.
- A control group is a collection of experimental units either not given a treatment of interest or given a treatment with an inactive substance (placebo).
- The placebo effect occurs when experimental units have a response to a placebo.
- For randomized block designs, treatments are assigned completely at random within each block.
- Blocking ensures that at the beginning of the experiment the units within each block are similar to each other with respect to at least one blocking variable.
- A randomized block design helps to separate natural variability from differences due to the blocking variable.
- A matched pairs design is a special case of a randomized block design.
- There are advantages and disadvantages for each experimental design.
- Statistical inference attributes conclusions based on data to the distribution from which the data were collected.
- Statistically significant differences between or among experimental treatment groups are evidence that the treatments caused the effect.
- Random assignment of treatments to experimental units allows researchers to conclude that some observed changes are so large as to be unlikely to have occurred by chance.
- Statistically significant differences between or among experimental treatment groups are evidence that the treatments caused the effect.
- If the experimental units used in an experiment are representative of some larger group of units, the results of an experiment can be generalized to the larger group.

Understanding/Key Learning:

- Given that variation may be random or not, conclusions are uncertain.
- Statistical investigative questions establish the purpose of research and direct the way in which data are collected.
- The way we collect data influences what we can and cannot say about a population.
- Well-designed experiments can establish evidence of causal relationships.

Do:

- Identify the three components of a statistical investigative question.
- Determine if a statistical study is an observational study or an experiment.
- Classify observational studies.
- Describe how to select a simple random sample.
- Describe how to select a stratified random sample.
- Describe how to select a cluster random sample.
- Describe how to select a systematic random sample.
- Determine the largest population to which results in a sample can be safely generalized.
- Explain the problems in poor data collection protocols.
- Identify the experimental units, the explanatory variable(s), the response variable, and the treatments in an experiment.
- Determine the composition of the treatments in a multi-factor experiment.
- Describe a method to randomly allocate/assign treatments to experimental units.
- Design a completely randomized experiment.
- Design a randomized block experiment.
- Design a matched pairs experiment.
- Identify blinding in an experiment.
- Describe the placebo effect in an experiment.
- Explain the purpose of blocking in an experiment.
- Explain the purpose of pairing in an experiment.
- Determine if differences in groups are statistically significant using a simulation.
- Determine if cause and effect inferences are justified based on the results and methodology of an experiment.

Unit Essential Questions:

- How do I state investigative questions that direct research methods?
- What are poor data collection practices?
- Why is randomness important in data collection?
- How does the design of a statistical study relate to the inferences that can be drawn from the study?

Lesson Essential Questions:

- What are the components of an investigative question?
- Which type of statistical study is being used?
- How is a representative sample obtained?
- What problems can occur when sampling?
- What are the principles of good experiments?
- How are experiments designed?
- What inferences can be drawn from statistical studies?

Materials/Resources:

Textbook

Graphing calculator

Online statistical applets (e.g. <https://www.stapplet.com/>)

Vocabulary:

Population	Census	Experimental units	Blinding
Sample	Sampling variability	Factor	Completely randomized experiment
Parameter	Bias	Level	Blocking
Statistic	Simple random sample	Treatment	Randomized block experiment
Statistical inference	Stratified random sample	Confounding	Matched pairs experiment
Observational study	Cluster random sample	Extraneous variable	Statistically significant
Prospective	Systematic sample	Random assignment	
Retrospective	Unbiased estimators	Comparison	
Experiment	Convenience sample	Replication	
	Voluntary response sample	Control	
	Undercoverage bias	Control group	
	Nonresponse	Placebo	
	Response bias	Placebo effect	

Assessments:

Unit quizzes
Unit tests
Informal and formal writing assignments
Presentations
Informal check of daily assignments
Progress check (College Board)



Central York School District

AP Statistics

Grade Level: 9 – 12

Unit 2 Part 1: Probability

Time: 8 days

Standards:

College Board 2026 CED for AP Statistics

- 2.1.A Compare tabular and graphical representations for the relationship between two categorical variables.
- 2.1.B Justify a claim using tabular and graphical representations for the distributions of two categorical variables.
- 2.2.A Calculate summary statistics from two-way tables.
- 2.2.B Compare summary statistics for two categorical variables.
- 2.2.C Justify a claim using summary statistics for two categorical variables.
- 2.3.A Estimate probabilities using simulations.
- 2.4.A Calculate probabilities for events and their complements.
- 2.5.A Justify why two events are mutually exclusive (or disjoint) using joint probability.
- 2.6.A Calculate conditional probabilities.
- 2.7.A Calculate probabilities for independent events and for the union of two events.

Know:

- Determine if two categorical variables are associated with graphical representations of two categorical variables.
- In a two-way table, a joint relative frequency is a cell frequency divided by the total for the entire table.
- Summary statistics for two categorical variables can be used to compare distributions and/or determine if variables are associated.
- Patterns in data do not necessarily mean that variation is not random.
- A random process generates results that are determined by chance.
- An outcome is the result of a trial of a random process.
- An event is a collection of outcomes.
- Simulation is a way to model random events, such that simulated outcomes closely match real-world outcomes.
- The relative frequency of an outcome or event in simulated or empirical data can be used to estimate the probability of that outcome or event.
- The law of large numbers states that simulated (empirical) probabilities tend to get closer to the true probability as the number of trials increases.
- The sample space of a random process is the set of all possible non-overlapping outcomes.
- The probability of an event is a number between 0 and 1, inclusive.
- Probabilities of events in repeatable situations can be interpreted as the relative frequency with which the event will occur in the long run.
- The probability that events A and B both will occur, sometimes called the joint probability, is the probability of the intersection of A and B, denoted $P(A \cap B)$.
- Two events are mutually exclusive or disjoint if they cannot occur at the same time. In other words, $P(A \cap B) = 0$.
- The probability that event A will occur given that event B has occurred is called a conditional probability and denoted $P(A | B) = P(A \cap B) / P(B)$.
- The multiplication rule states that the probability that events A and B both will occur is $P(A \cap B) = P(A) \cdot P(B | A)$.

- Events A and B are independent if, and only if, knowing whether event A has occurred (or will occur) does not change the probability that event B will occur.
- For independent events, $P(A \cap B) = P(A) \cdot P(B)$.
- The probability that event A or event B (or both) will occur is the probability of the union of A and B, denoted $P(A \cup B)$.
- The addition rule states that the probability that event A or event B or both will occur is $P(A \cup B) = P(A) + P(B) - P(A \cap B)$.

Understanding/Key Learning:

- Information about two categorical variables can be summarized with a two-way table.
- Claims can be justified (or not) by analyzing data.
- Given that variation may be random or not, conclusions are uncertain.
- Simulation allows us to anticipate patterns in data.
- The likelihood of a random event can be quantified.
- Probability distributions may be used to model variation in populations.
- Probabilistic reasoning allows us to anticipate patterns in data.

Do:

- Display the relationship between two categorical variables with side-by-side bar graphs.
- Display the relationship between two categorical variables with segmented bar graphs.
- Display the relationship between two categorical variables with mosaic plots.
- Organize data from two categorical variables with a two-way table.
- Compute marginal relative frequencies in two-way tables.
- Compute conditional relative frequencies in two-way tables.
- Calculate the probability of an event given equally likely outcomes.
- Find the probability of the complement of an event E.
- Calculate the joint probability of the event (A and B) for independent events.
- Calculate the conditional probability of the event (A | B).
- Calculate the joint probability of the event (A and B) for dependent events.
- Justify whether two events are independent.
- Calculate the probability of the event (A or B).

Unit Essential Questions:

- Is there an association between two categorical variables?
- How certain can we be about our conclusions?
- How can simulation be used to model chance in our world?
- How can mathematics be used to model chance in our world?

Lesson Essential Questions:

- How are data from two categorical variables organized?
- Is there an association between two categorical variables?
- What does "random" mean?
- How is chance quantified?
- What are mutually exclusive events?
- What is the probability of an event occurring when it depends on the outcome of another event?
- What is the probability of independent events and unions of events?

Materials/Resources:

Textbook

Graphing calculator

Online statistical applets (e.g. <https://www.stapplet.com/>)

Vocabulary:

Explanatory variable	Random process	Mutually exclusive
Response variable	Outcome	Disjoint
Two-way table (contingency table)	Event	Joint probability
Marginal distribution	Relative frequency	Intersection
Conditional distribution	Law of large numbers	Conditional probability
Association	Probability	The multiplication rule
Statistical tendency	Simulation	The addition rule
	Complement	Union
	Sample space	Independent events

Assessments:

Unit quizzes
Unit tests
Informal and formal writing assignments
Presentations
Informal check of daily assignments
Progress check (College Board)



Central York School District

AP Statistics

Grade Level: 9 – 12

Unit 2 Part 2: Random Variables and Probability Distributions

Time: 10 days

Standards:

College Board 2026 CED for AP Statistics

- 2.8.A Construct a probability distribution for a discrete random variable.
- 2.9.A Calculate the mean and standard deviation for a discrete random variable.
- 2.9.B Interpret the mean and standard deviation for a discrete random variable.
- 2.10.A Justify why a random variable is or is not a binomial random variable.
- 2.10.B Calculate the mean and standard deviation for a binomial distribution.
- 2.10.C Interpret the mean, standard deviation, and probabilities for a binomial distribution.
- 2.10.D Estimate probabilities of binomial random variables using data from a simulation.
- 2.10.E Calculate probabilities for a binomial distribution.
- 2.11.A Describe a normal distribution.
- 2.11.B Calculate the mean and standard deviation for a normal distribution.
- 2.11.C Calculate percentages from a normal distribution using the empirical rule.
- 2.11.D Calculate the probability that a particular value lies within a given interval of a normal distribution.
- 2.11.E Calculate the associated intervals and areas of a normal distribution.
- 2.11.F Compare measures of relative position for distributions.
- 2.12.A Describe sampling distributions with simulations.

Know:

- The values of a random variable are the numerical outcomes of random behavior.
- A discrete random variable is a variable that can only take a countable number of values.
- The sum of the probabilities over all of the possible values of a random variable must be 1.
- A probability distribution can be represented as a graph, table, or function showing the probabilities associated with values of a random variable.
- A cumulative probability distribution can be represented as a table or function showing the probability of being less than or equal to each value of the random variable.
- An interpretation of a probability distribution provides information about the shape, center, and spread of a population.
- A numerical value measuring a characteristic of a population or the distribution of a random variable is known as a parameter, which is a single, fixed value.
- Parameters for a discrete random variable should be interpreted using appropriate units and within the context of a specific population.
- A probability distribution can be constructed using the rules of probability or estimated with a simulation using random number generators.
- Two random variables are independent if knowing information about one of them does not change the probability distribution of the other.
- A binomial random variable, X , counts the number of successes in n repeated independent trials, each trial having two possible outcomes (success or failure), with the probability of success p and the probability of failure $1 - p$.

- The binomial probability function is $P(X = x) = {}_nC_x(p)^x(1 - p)^{n-x}$.
- If a random variable is binomial, its mean $\mu_x = np$ and its standard deviation $\sigma_x = \sqrt{np(1 - p)}$.
- Probabilities and parameters for a binomial distribution should be interpreted using appropriate units and within the context of a specific population or situation.
- A continuous random variable is a variable that can take on any value within a specified domain. Every interval within the domain has a probability associated with it.
- A normal distribution can be described as a continuous, unimodal, bell-shaped, and symmetric curve.
- A normal curve can be used to model a distribution of data and a continuous random variable.
- The parameters of a normal distribution are the population mean, μ , and the population standard deviation, σ .
- A standard normal distribution is a normal distribution with mean $\mu = 0$ and standard deviation $\sigma = 1$.
- The empirical rule for a normal distribution states that in an approximately normal distribution, about 68% of values are within 1 standard deviation of the mean, about 95% of values are within 2 standard deviations of the mean, and about 99.7% of values are within 3 standard deviations of the mean.
- The area under a normal curve over a given interval represents the probability that a particular value lies in that interval.
- The boundaries of an interval associated with a given area in a normal distribution can be determined using z-scores or technology.
- Intervals associated with a given area in a normal distribution can be determined by assigning appropriate inequalities to the boundaries of the intervals.
- Normal distributions can be used to approximate distributions with similar characteristics. A sampling distribution of a statistic is the distribution of values of the statistic for all possible samples of a given size from a given population.
- The sampling distribution of a statistic can be simulated by repeatedly generating a large number of random samples from the population assuming known value(s) for the parameter(s).
- A randomization distribution is the distribution of a statistic generated by simulation from repeatedly randomly reallocating, or reassigning, the response values to treatment groups.
- The central limit theorem (CLT) states that the sampling distribution of a mean of a random sample has a shape that can be approximated by a normal distribution.

Understanding/Key Learning:

- Given that variation may be random or not, conclusions are uncertain.
- Simulation allows us to anticipate patterns in data.
- The likelihood of a random event can be quantified.
- Probability distributions may be used to model variation in populations.
- Probabilistic reasoning allows us to anticipate patterns in data.

Do:

- Calculate the probability of an event given equally likely outcomes.
- Find the probability of the complement of an event E.
- Calculate the joint probability of the event (A and B) for independent events.
- Calculate the conditional probability of the event (A | B).
- Calculate the joint probability of the event (A and B) for dependent events.
- Justify whether two events are independent.
- Calculate the probability of the event (A or B).
- Represent the probability distribution of a discrete random variable in a table.
- Represent the probability distribution of a discrete random variable with a histogram.
- Find the probability of a value of a random variable.
- Find the probability of an event defined for a random variable.
- Compute and interpret the mean of a discrete random variable.
- Compute and interpret the standard deviation of a discrete random variable.
- Find and interpret the mean of a linear combination of random variables.

- Find and interpret the standard deviation of a linear combination of independent random variables.
- Find and interpret the mean of a linear transformation of a random variable.
- Find and interpret the standard deviation of a linear transformation of a random variable.
- Justify whether a random variable is a binomial random variable.
- Calculate the probability of an event for a binomial random variable.
- Calculate and interpret the mean of a binomial random variable.
- Calculate and interpret the standard deviation of a binomial random variable.
- Calculate the probability of an event for a normal random variable.
- Calculate the mean or standard deviation of a normal random variable, given other information about the distribution.
- Simulate the sampling distribution of a sample statistic.

Unit Essential Questions:

- How certain can we be about our conclusions?
- How can simulation be used to model chance in our world?
- How can mathematics be used to model chance in our world?

Lesson Essential Questions:

- What does “random” mean?
- How is chance quantified?
- What are mutually exclusive events?
- What is the probability of an event occurring when it depends on the outcome of another event?
- What is the probability of independent events and unions of events?
- What is a random variable?
- How much do the values of random variables vary?
- How can random variables be combined?
- How can likelihoods be quantified in binomial settings?
- How can likelihoods be quantified by normal random variables?
- How can we simulate statistics generated by random samples?

Materials/Resources:

Textbook

Graphing calculator

Online statistical applets (e.g. <https://www.stapplet.com/>)

Vocabulary:

Random variable	Binomial random variable	Sampling distribution
Discrete random variable	Normal random variable	Randomization distribution
Probability distribution		Central Limit Theorem
Cumulative probability distribution		
Parameter		
Mean of a random variable		
Standard deviation of a random variable		

Assessments:

Unit quizzes

Unit tests

Informal and formal writing assignments

Presentations

Informal check of daily assignments
Progress check (College Board)



Central York School District

AP Statistics

Grade Level: 9 – 12

Unit 3 Part 1: Inference for One Proportion

Time: 9 days

Standards:

College Board 2026 CED for AP Statistics

- 3.1.A Justify why an estimator is or is not unbiased.
- 3.1.B Calculate estimates for a population parameter.
- 3.2.A Calculate the mean and standard deviation of a sampling distribution for a sample proportion.
- 3.2.B Justify the appropriateness of conditions for the sampling distribution of a sample proportion.
- 3.2.C Interpret the mean, standard deviation, and probabilities for a sampling distribution of a sample proportion.
- 3.3.A Identify an appropriate confidence interval procedure including the parameter for a population proportion.
- 3.3.B Justify the appropriateness of constructing a confidence interval for a population proportion by verifying conditions.
- 3.3.C Calculate an appropriate confidence interval for a population proportion.
- 3.3.D Calculate the standard error and margin of error of a sample statistic for a confidence interval for a population proportion, and estimate a given sample size from the margin of error.
- 3.4.A Interpret a confidence interval in context for a population proportion.
- 3.4.B Justify a claim based on a confidence interval for a population proportion.
- 3.4.C Identify the relationships among sample size, confidence interval width, confidence level, and margin of error for a population proportion.
- 3.5.A Identify an appropriate testing method for a population proportion including the parameter for the population proportion.
- 3.5.B Identify the null and alternative hypotheses for a population proportion.
- 3.5.C Justify the appropriateness of a hypothesis test for a population proportion by verifying conditions.
- 3.6.A Interpret the p-value of a hypothesis test for a population proportion.
- 3.7.A Calculate an appropriate test statistic and p-value for testing a hypothesis about a population proportion.
- 3.7.B Justify a claim about the population based on the results of a hypothesis test for a population proportion.
- 3.8.A Identify Type I and Type II errors.
- 3.8.B Calculate the probability of Type I and Type II errors.
- 3.8.C Identify the factors that affect the probability of errors in hypothesis testing.
- 3.8.D Interpret Type I and Type II errors.

Know:

- A sampling distribution of a statistic is the distribution of values for the statistic for all possible samples of a given size from a given population.
- A randomization distribution is a collection of statistics generated by simulation assuming known values for the parameters.
- The sampling distribution of a statistic can be simulated by generating repeated random samples from a population.
- When estimating a population parameter, an estimator is unbiased if, on average, the value of the estimator is equal to the population parameter.

- When estimating a population parameter, an estimator exhibits variability that can be modeled using probability.
- A sample statistic is a point estimator of the corresponding population parameter.
- The sampling distribution of the sample proportion, $\hat{p}$, has a mean p and a standard deviation $\sqrt{\frac{p(1-p)}{n}}$.
- If sampling without replacement, the standard deviation of the sample proportion is smaller than what is given by the formula above.
- If the sample size is less than 10% of the population size, the difference between the formula and the actual standard deviation is negligible.
- The sampling distribution of the sample proportion, $\hat{p}$, will have an approximate normal distribution, provided $np \geq 10$ and $n(1-p) \geq 10$.
- Probabilities and parameters for a sampling distribution for a sample proportion should be interpreted using appropriate units and within the context of a specific population.
- The appropriate confidence interval procedure for a one-sample proportion for one categorical variable is a one sample z-interval for a proportion.
- In order to make assumptions necessary for inference on population proportions, means, and slopes, we must check for independence in data collection methods and for selection of the appropriate sampling distribution.
- The standard error of $\hat{p}$ is $\sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$.
- A margin of error gives how much a value of a sample statistic is likely to vary from the value of the corresponding population parameter.
- The margin of error of $\hat{p}$ is $z^* \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$.
- The formula for margin of error can be rearranged to solve for n , the minimum sample size needed to achieve a given margin of error.
- In general, an interval estimate can be constructed as a point estimate $\pm$ (margin of error).
- For a one sample z-interval for a proportion, the interval estimate is $\hat{p} \pm z^* \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$.
- Critical values represent the boundaries encompassing the middle C% of the standard normal distribution, where C% is an approximate confidence level for a proportion.
- Confidence intervals for population proportions can be used to calculate interval estimates with specified units.
- Confidence intervals are based on data from random samples, which vary from sample to sample.
- A confidence interval for a population proportion either contains the population proportion or it does not.
- We are C% confident that the confidence interval for a population proportion captures the population proportion.
- In repeated random sampling with the same sample size, approximately C% of confidence intervals created will capture the population proportion.
- Interpreting a confidence interval for a one-sample proportion should include a reference to the sample taken and details about the population it represents.
- When all other things remain the same, the width of the confidence interval for a population proportion tends to decrease as the sample size increases.
- For a population proportion, the width of the confidence interval is proportional to $1/\sqrt{n}$.
- For a given sample, the width of the confidence interval for a population proportion increases as the confidence level increases.
- The width of a confidence interval for a population proportion is exactly twice the margin of error.
- The null hypothesis is the situation that is assumed to be correct unless evidence suggests otherwise, and the alternative hypothesis is the situation for which evidence is being collected.
- For a one-sample z-test for a population proportion, the null hypothesis specifies a value for the population proportion, usually one indicating no difference or effect.
- For a single categorical variable, the appropriate testing method for a population proportion is a one-sample z-test for a population proportion.

- The distribution of the test statistic assuming the null hypothesis is true (null distribution) can be either a randomization distribution or when a probability model is assumed to be true, a theoretical distribution (z).
- When using a z-test, the standardized test statistic can be written as

$$\text{standardized test statistic} = \frac{\text{sample statistic} - \text{null value of the parameter}}{\text{standard deviation of the statistic}}$$
- The test statistic for a population proportion is $z = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0(1-p_0)}{n}}}$.
- A p-value is the probability of obtaining a test statistic as extreme or more extreme than the observed test statistic when the null hypothesis and probability model are assumed to be true.
- The p-value is the proportion of values for the null distribution that are as extreme or more extreme than the observed value of the test statistic.
- An interpretation of the p-value of a significance test for a one-sample proportion should recognize that the p-value is computed by assuming that the true population proportion is equal to the particular value stated in the null hypothesis.
- The significance level α is the predetermined probability of rejecting the null hypothesis given that it is true.
- A formal decision explicitly compares the p-value to the significance level α .
- If the p-value $\leq \alpha$, reject the null hypothesis. If the p-value $> \alpha$, fail to reject the null hypothesis.
- Rejecting the null hypothesis means there is sufficient statistical evidence to support the alternative hypothesis.
- Failing to reject the null means there is insufficient statistical evidence to support the alternative hypothesis.
- The conclusion about the alternative hypothesis must be stated in context.
- A significance test can lead to rejecting or not rejecting the null hypothesis, but can never lead to concluding or proving that the null hypothesis is true.
- Small p-values indicate that the observed value of the test statistic would be unusual if the null hypothesis and probability model were true.
- The lower the p-value, the more convincing the statistical evidence for the alternative hypothesis.
- p-values that are not small indicate that the observed value of the test statistic would not be unusual if the null hypothesis and probability model were true.
- p-values that are not small do not provide evidence that the null hypothesis is true.
- A Type I error occurs when the null hypothesis is true and is rejected (false positive).
- A Type II error occurs when the null hypothesis is false and is not rejected (false negative).
- The significance level α is the probability of making a Type I error, if the null hypothesis is true.
- The power of a test is the probability that a test will correctly reject a false null hypothesis.
- The probability of making a Type II error = 1 - power.
- Whether a Type I or a Type II error is more consequential depends upon the situation.
- Since the significance level α is the probability of a Type I error, the consequences of a Type I error influence decisions about a significance level.

Understanding/Key Learning:

- Given that variation may be random or not, conclusions are uncertain.
- An interval of values should be used to estimate parameters, in order to account for uncertainty.
- The normal distribution may be used to model variation in sample statistics.
- Significance testing allows us to make decisions about hypotheses within a particular context.
- Probabilities of Type I and Type II errors influence inference.

Do:

- Determine whether an estimator of a population parameter is biased or unbiased.
- Verify whether the conditions for the sampling distribution of the sample proportion $\hat{p}$ have been met.
- Compute the mean and standard deviation of the sampling distribution of the sample proportion $\hat{p}$.
- Compute probabilities of events given the sampling distribution of a sample proportion $\hat{p}$.

- Check for independence (random and 10% conditions) and that the sampling distribution is approximately normal (Large Counts condition) before constructing a confidence interval to estimate a population proportion p .
- Compute the margin of error for a population proportion p .
- Calculate the minimum sample size required to estimate p given a required margin of error.
- Check for independence (random and 10% conditions) and that the sampling distribution is approximately normal (Large Counts condition) before constructing a confidence interval for a population proportion p .
- Calculate and interpret a one-sample z interval for p .
- Interpret the confidence level of a confidence interval.
- Evaluate a claim about a parameter using a confidence interval.
- Describe how the margin of error relates to sample size and confidence level.
- State hypotheses for a significance test about a population proportion.
- Check for independence (random and 10% conditions) and that the sampling distribution is approximately normal (Large Counts condition) before performing a significance test about a population proportion p .
- Calculate the standardized test statistic and p -value for a one-sample z test for p .
- State a conclusion for a one-sample z test for p .
- Interpret the p -value for a one-sample z test for p .
- Describe a Type I error and give a possible consequence of such an error.
- Describe a Type II error and give a possible consequence of such an error.
- Explain how sample size, significance level, standard error, and the true (alternative) value of the parameter influence the power of a test.

Unit Essential Questions:

- What is an unusual event when sampling from a population?
- What patterns occur when sampling from a population when measuring a categorical variable?
- How is an unknown population parameter estimated?
- How is a claim about an unknown population parameter tested?

Lesson Essential Questions:

- What happens to sampling distributions when sample size increases?
- What is an unbiased estimator?
- What is the sampling distribution of a sample proportion?
- How can a population proportion be estimated?
- What affects margin of error?
- How is a claim about a population proportion tested?
- What does a P -value mean?
- What is the conclusion for a test about a population proportion?
- What errors could occur when testing a population proportion?

Materials/Resources:

Textbook

Graphing calculator

Online statistical applets (e.g. <https://www.stapplet.com/>)

Vocabulary:

Sampling distribution	Confidence level	Null hypothesis	Type I error
Randomization distribution	Critical value	Alternative hypothesis	Type II error
Biased estimator	Margin of error	One-sided hypothesis	Power of a test
Unbiased estimator	One-sample z interval for p	Two-sided hypothesis	
Point estimate		One-sample z test for p	
Point estimator		Standardized test statistic	

Standard error
Sampling distribution of the
sample proportion
Random condition
10% condition
Large Counts condition

P-value
Significance level

Assessments:

Unit quizzes
Unit tests
Informal and formal writing assignments
Presentations
Informal check of daily assignments
Progress check (College Board)



Central York School District

AP Statistics

Grade Level: 9 – 12

Unit 3 Part 2: Inference for Two Proportions and Two-way Tables

Time: 8 days

Standards:

College Board 2026 CED for AP Statistics

- 3.9.A Calculate the mean and standard deviation of the sampling distribution for the difference between two sample proportions.
- 3.9.B Justify the appropriateness of conditions for the sampling distribution for the difference between two sample proportions.
- 3.9.C Interpret the mean, standard deviation, and probabilities for the sampling distribution for the difference between two sample proportions.
- 3.10.A Identify an appropriate confidence interval procedure including the parameters for the difference between two population proportions.
- 3.10.B Justify the appropriateness of constructing a confidence interval for the difference between two population proportions by verifying conditions.
- 3.10.C Calculate an appropriate confidence interval for the difference between two population proportions.
- 3.10.D Calculate the standard error and margin of error for estimating the difference between two population proportions.
- 3.11.A Interpret a confidence interval in context for the difference between two population proportions.
- 3.11.B Justify a claim based on a confidence interval for the difference between two population proportions.
- 3.12.A Identify an appropriate testing method for the difference between population proportions including the parameters.
- 3.12.B Identify the null and alternative hypotheses for the difference between population proportions.
- 3.12.C Justify the appropriateness of a hypothesis test for the difference between two population proportions by verifying conditions.
- 3.13.A Calculate an appropriate test statistic and p-value for testing a hypothesis for the difference between two population proportions.
- 3.13.B Interpret the p-value of a hypothesis test for the difference between two population proportions.
- 3.13.C Justify a claim about the populations based on the results of a hypothesis test for the difference between two population proportions.
- 3.14.A Describe chi-square distributions.
- 3.14.B Identify an appropriate testing method for comparing distributions in two-way tables of categorical data including the populations and variables.
- 3.14.C Identify the null and alternative hypotheses for a chi-square test for homogeneity or independence.
- 3.14.D Justify the appropriateness of a chi-square test for independence or homogeneity by verifying conditions.
- 3.15.A Calculate expected counts for two-way tables of categorical data.
- 3.15.B Calculate the appropriate test statistic and p-value for a chi-square test for homogeneity or independence.
- 3.15.C Interpret the p-value for the chi-square test for homogeneity or independence.
- 3.15.D Justify a claim about the population(s) based on the results of a chi-square test for homogeneity or independence.

Know:

- The sampling distribution of the difference in sample proportions $\hat{p}_1 - \hat{p}_2$ has mean $p_1 - p_2$ and standard deviation $\sqrt{\frac{p_1(1-p_1)}{n_1} + \frac{p_2(1-p_2)}{n_2}}$
- If sampling without replacement, the standard deviation of the difference in proportions is smaller than what is given by the formula above.
- If the sample size is less than 10% of the population size, the difference between the formula and the actual standard deviation is negligible.
- The sampling distribution of the difference in proportions will have an approximate normal distribution, provided $n_1 p_1 \geq 10$ and $n_1(1-p_1) \geq 10$ and $n_2 p_2 \geq 10$ and $n_2(1-p_2) \geq 10$.
- Parameters for a sampling distribution for a difference of proportions should be interpreted using appropriate units and within the context of specific populations.
- The appropriate confidence interval procedure for a two-sample comparison of proportions for one categorical variable is a two-sample z-interval for a difference between population proportions.
- In order to calculate confidence intervals to estimate a difference between proportions, we must check for independence and that the sampling distribution is approximately normal.
- For a comparison of proportions, the interval estimate is $\hat{p}_1 - \hat{p}_2 \pm z^* \sqrt{\frac{\hat{p}_1(1-\hat{p}_1)}{n_1} + \frac{\hat{p}_2(1-\hat{p}_2)}{n_2}}$
- Confidence intervals for a difference in proportions can be used to calculate interval estimates with specified units.
- In repeated random sampling with the same sample size, approximately C% of confidence intervals created will capture the difference in population proportions.
- A confidence interval for difference in population proportions provides an interval of values that may provide sufficient evidence to support a particular claim in context.
- For a single categorical variable, the appropriate testing method for the difference of two population proportions is a two-sample z-test for a difference between two population proportions.
- In order to make statistical inferences when testing a difference between population proportions, we must check for independence and that the sampling distribution is approximately normal.
- The test statistic for a difference in proportions is $z = \frac{(\hat{p}_1 - \hat{p}_2) - 0}{\sqrt{\hat{p}_c(1-\hat{p}_c)\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$ where $\hat{p}_c = \frac{n_1 \hat{p}_1 + n_2 \hat{p}_2}{n_1 + n_2}$.
- An interpretation of the p-value of a significance test for a difference of two population proportions should recognize that the p-value is computed by assuming that the null hypothesis is true.
- The results of a significance test for a difference of two population proportions can serve as the statistical reasoning to support the answer to an investigative question about the two populations that were sampled.
- Variation between what we find and what we expect to find may be random or not.
- Expected counts of categorical data are counts consistent with the null hypothesis. In general, an expected count is a sample size times a probability.
- The chi-square statistic measures the distance between observed and expected counts relative to expected counts.
- Chi-square distributions have positive values and are skewed right. Within the family of chi-square density curves, the skewness becomes less pronounced with increasing degrees of freedom.
- The distribution of a test statistic assuming the null hypothesis is true (null distribution) can be either a randomization distribution or, when a probability model is assumed to be true, a theoretical distribution (chi-square).
- The expected count in a particular cell of a two-way table of categorical data can be calculated using the formula $expected\ count = \frac{(row\ total)(column\ total)}{table\ total}$.
- The appropriate hypotheses for a chi-square test for homogeneity are:
 H_0 : There is no difference in distributions of a categorical variable across populations or treatments.

H_a : There is a difference in distributions of a categorical variable across populations or treatments.

- The appropriate hypotheses for a chi-square test for independence are:

H_0 : There is no association between two categorical variables in a given population or the two categorical variables are independent.

H_a : Two categorical variables in a population are associated or dependent.

- When comparing distributions to determine whether proportions in each category for categorical data collected from different populations are the same, the appropriate test is the chi-square test for homogeneity.
- To determine whether row and column variables in a two-way table of categorical data might be associated in the population from which the data were sampled, the appropriate test is the chi-square test for independence.
- In order to make statistical inferences for a chi-square test for homogeneity or independence we must check for independence (Random and 10% condition) and that the sampling distribution has an approximately Chi-square distribution (Large Counts condition).
- The appropriate test statistic for a chi-square test for homogeneity or independence is the chi-square statistic $\chi^2 = \sum \frac{(\text{observed count} - \text{expected count})^2}{\text{expected count}}$ with degrees of freedom = (number of rows - 1) $\times$ (number of columns - 1).
- The p-value for a chi-square test for independence or homogeneity for a number of degrees of freedom is found using the appropriate table or technology.
- For a test of independence or homogeneity for a two-way table, the p-value is the proportion of values in a chi-square distribution with appropriate degrees of freedom that are equal to or larger than the test statistic.
- An interpretation of the p-value for the chi-square test for homogeneity or independence is the probability, given the null hypothesis and probability model are true, of obtaining a test statistic as, or more, extreme than the observed value.
- A decision to either reject or fail to reject the null hypothesis for a chi-square test for homogeneity or independence is based on comparison of the p-value to the significance level α .
- The results of a chi-square test for homogeneity or independence can serve as the statistical reasoning to support the answer to a research question about the population that was sampled (independence) or the populations that were sampled (homogeneity).

Understanding/Key Learning:

- Given that variation may be random or not, conclusions are uncertain.
- An interval of values should be used to estimate parameters, in order to account for uncertainty.
- The normal distribution may be used to model variation in sample statistics.
- Significance testing allows us to make decisions about hypotheses within a particular context.
- Probabilities of Type I and Type II errors influence inference.
- The chi-square distribution may be used to model variation.

Do:

- Verify whether the conditions for the sampling distribution of a difference in proportions $\hat{p}_1 - \hat{p}_2$ have been met.
- Compute the mean and standard deviation of the sampling distribution of a difference in proportions $\hat{p}_1 - \hat{p}_2$.
- Compute probabilities of events given the sampling distribution of a difference in proportions $\hat{p}_1 - \hat{p}_2$.
- Check for independence (random and 10% conditions) and that the sampling distribution is approximately normal (Large Counts condition) before constructing a confidence interval for a difference in two population proportions $p_1 - p_2$.
- Calculate and interpret a two-sample z interval for $p_1 - p_2$.
- State hypotheses for a significance test about a difference in two population proportions $p_1 - p_2$.

- Check for independence (random and 10% conditions) and that the sampling distribution is approximately normal (Large Counts condition) before performing a significance test about a difference in two population proportions $p_1 - p_2$.
- Calculate the standardized test statistic and p-value for a two-sample z test for $p_1 - p_2$.
- State a conclusion for a two-sample z test for $p_1 - p_2$.
- Interpret the p-value of a significance test.
- Describe a Type I error and give a possible consequence of such an error.
- Describe a Type II error and give a possible consequence of such an error.
- Explain how sample size, significance level, standard error, and the true (alternative) value of the parameter influence the power of a test.
- State hypotheses for a chi-square test for independence.
- Compute expected counts for a two-way table given a null hypothesis.
- Check for independence (random and 10% conditions) and that the sampling distribution is approximately chi-square before performing a chi-square test for independence.
- Calculate the χ^2 test statistic and p-value for a chi-square test for independence.
- State a conclusion for a chi-square test for independence.
- State hypotheses for a chi-square test for homogeneity.
- Check for independence (random and 10% conditions) and that the sampling distribution is approximately chi-square before performing a chi-square test for homogeneity.
- Calculate the χ^2 test statistic and p-value for a chi-square test for homogeneity.
- State a conclusion for a chi-square test for homogeneity.

Unit Essential Questions:

- What is an unusual event when sampling from a population?
- What patterns occur when sampling from two populations when measuring categorical variables?
- How is an unknown difference in population parameters estimated?
- How is a claim about an unknown difference in population parameters tested?
- How can inferences about relationships between categorical variables be made?

Lesson Essential Questions:

- What is the sampling distribution of a difference in sample proportions?
- How can a difference in two population proportions be estimated?
- How can a claim about a difference in two population proportions be tested?
- How is a claim about independence between two categorical variables in one population tested?
- How is a claim about the distribution of a categorical variable in multiple populations tested?

Materials/Resources:

Textbook

Graphing calculator

Online statistical applets (e.g. <https://www.stapplet.com/>)

Vocabulary:

Difference in proportions	Two-sample z test for $p_1 - p_2$	Observed counts	Association
Independent samples		Expected counts	Independence
Sampling distribution of a difference in proportions	Two-sample z interval for $p_1 - p_2$	χ^2 -distribution	Chi-square test for independence
		Two-way table	Chi-square test for homogeneity

Assessments:

Unit quizzes

Unit tests

Informal and formal writing assignments

Presentations

Informal check of daily assignments

Progress check (College Board)



Central York School District

AP Statistics

Grade Level: 9 – 12

Unit 4 Part 1: Inference for One Mean

Time: 7 days

Standards:

College Board 2026 CED for AP Statistics

- 4.1.A Calculate the mean and standard deviation of a sampling distribution of a sample mean.
- 4.1.B Justify the appropriateness of conditions for the sampling distribution of a sample mean.
- 4.1.C Interpret the mean, standard deviation, and probabilities for the sampling distribution of a sample mean.
- 4.2.A Describe t-distributions.
- 4.2.B Identify an appropriate confidence interval procedure including the parameter for a population mean or population mean difference.
- 4.2.C Justify the appropriateness of constructing a confidence interval for a population mean or population mean difference by verifying conditions.
- 4.2.D Calculate an appropriate confidence interval for a population mean or population mean difference.
- 4.2.E Calculate the standard error and margin of error for a sample size for a one-sample t-interval.
- 4.3.A Interpret a confidence interval in context for a population mean or population mean difference.
- 4.3.B Justify a claim based on a confidence interval for a population mean or population mean difference.
- 4.3.C Identify the relationships among sample size, confidence interval width, confidence level, and margin of error for a population mean or population mean difference.
- 4.4.A Identify an appropriate testing method and parameter for a population mean or population mean difference with unknown σ .
- 4.4.B Identify the null and alternative hypotheses for a population mean or population mean difference with unknown σ .
- 4.4.C Justify the appropriateness of a hypothesis test for a population mean or population mean difference by verifying conditions.
- 4.5.A Calculate an appropriate test statistic and p-value for testing a hypothesis about a population mean or population mean difference.
- 4.5.B Interpret the p-value of a hypothesis test for a population mean or population mean difference.
- 4.5.C Justify a claim about the population based on the results of a hypothesis test for a population mean or population mean difference.

Know:

- The sampling distribution of the sample mean $\bar{x}$ has mean μ and standard deviation $\sigma/\sqrt{n}$.
- If sampling without replacement, the standard deviation of the sample mean is smaller than what is given by the formula above.
- If the sample size is less than 10% of the population size, the difference between the formula and the actual standard deviation is negligible.
- The central limit theorem (CLT) states that when the sample size is sufficiently large, a sampling distribution of the mean of a random variable will be approximately normally distributed.
- The central limit theorem requires that the sample values are independent of each other and that n is sufficiently large.
- The sampling distribution of the sample mean $\bar{x}$, will have an approximate normal distribution, provided the population is approximately normal or the sample size is large (e.g $n \geq 30$).

- Probabilities and parameters for a sampling distribution for a sample mean should be interpreted using appropriate units and within the context of a specific population.
- When s is used instead of σ to calculate a test statistic, the corresponding distribution, known as the t -distribution.
- The t -distribution varies from the normal distribution in shape, in that more of the area is allocated to the tails of the density curve than in a normal distribution.
- As the degrees of freedom increase, the area in the tails of a t -distribution decreases.
- Because σ is typically not known for distributions of quantitative variables, the appropriate confidence interval procedure for estimating the population mean of one quantitative variable for one sample is a one-sample t -interval for a mean.
- For one quantitative variable X that is normally distributed, the distribution of $t = \frac{\bar{x} - \mu_0}{\frac{s}{\sqrt{n}}}$ is a t -distribution with $n - 1$ degrees of freedom.
- Matched pairs can be thought of as one sample of pairs. Once differences between pairs of values are found, inference for confidence intervals proceeds as for a population mean.
- In order to calculate confidence intervals to estimate a population mean, we must check for independence and that the sampling distribution is approximately normal.
- The standard error of $\bar{x}$ is $\frac{s}{\sqrt{n}}$.
- The margin of error of $\bar{x}$ is $t^* \frac{s}{\sqrt{n}}$.
- The point estimate for a population mean is the sample mean $\bar{x}$.
- For the population mean for one sample with unknown population standard deviation, the confidence interval is $\bar{x} \pm t^* \frac{s}{\sqrt{n}}$.
- A confidence interval for a population mean either contains the population mean or it does not.
- We are $C\%$ confident that the confidence interval for a population mean captures the population mean.
- An interpretation of a confidence interval for a population mean includes a reference to the sample taken and details about the population it represents.
- A confidence interval for a population mean provides an interval of values that may provide sufficient evidence to support a particular claim in context.
- When all other things remain the same, the width of a confidence interval for a population mean tends to decrease as the sample size increases.
- For a population mean, the width of the confidence interval is proportional to $1/\sqrt{n}$.
- For a given sample, the width of the confidence interval for a population mean increases as the confidence level increases.
- The appropriate test for a population mean with unknown σ is a one-sample t -test for a population mean.
- Matched pairs can be thought of as one sample of pairs. Once differences between pairs of values are found, inference for significance testing proceeds as for a population mean.
- When finding the mean difference μ_d between values in a matched pair, it is important to define the order of subtraction.
- In order to make statistical inferences when testing a population mean, we must check for independence and that the sampling distribution is approximately normal.
- For a single quantitative variable when random sampling with replacement from a population that can be modeled with a normal distribution with mean μ and standard deviation σ , the sampling distribution of $t = \frac{\bar{x} - \mu_0}{\frac{s}{\sqrt{n}}}$ has a t -distribution with $n - 1$ degrees of freedom.
- An interpretation of the p -value of a significance test for a population mean should recognize that the p -value is computed by assuming that the null hypothesis is true.
- A formal decision explicitly compares the p -value to the significance level α .
- If the p -value $\leq \alpha$, reject the null hypothesis. If the p -value $> \alpha$, fail to reject the null hypothesis.
- The results of a significance test for a population mean can serve as the statistical reasoning to support the

answer to an investigative question about the population that was sampled.

- Random variation may result in errors in statistical inference.

Understanding/Key Learning:

- Random variation may result in errors in statistical inference.
- The t -distribution may be used to model variation.
- An interval of values should be used to estimate parameters, in order to account for uncertainty.
- Significance testing allows us to make decisions about hypotheses within a particular context.

Do:

- Verify whether the conditions for the sampling distribution of the sample mean $\bar{x}$ have been met.
- Compute the mean and standard deviation of the sampling distribution of the sample mean $\bar{x}$.
- Explain the Central Limit Theorem in the context of a given population.
- Compute probabilities of events given the sampling distribution of a sample mean $\bar{x}$.
- Check for independence (random and 10% conditions) and that the sampling distribution is approximately normal (Normal/large sample condition) before constructing a confidence interval to estimate a population mean μ .
- Determine the critical value t^* using a table or technology.
- Calculate and interpret a one-sample t interval for μ .
- Check for independence (random and 10% conditions) and that the sampling distribution is approximately normal (Normal/large sample condition) before constructing a confidence interval to estimate a population mean difference μ_{Diff} .
- Calculate and interpret a paired t interval for μ_{Diff} .
- Interpret the confidence level of a confidence interval.
- Evaluate a claim about a parameter using a confidence interval.
- Describe how the margin of error relates to sample size and confidence level.
- State hypotheses for a significance test about a population mean μ .
- Check for independence (random and 10% conditions) and that the sampling distribution is approximately normal (Large Counts condition) before performing a significance test about a population mean μ .
- Calculate the standardized test statistic and p-value for a one-sample t test for μ .
- State a conclusion for a paired t test for μ_{Diff} .
- State hypotheses for a significance test about a population mean difference μ_{Diff} .
- Check for independence (random and 10% conditions) and that the sampling distribution is approximately normal (Large Counts condition) before performing a significance test about a population mean difference μ_{Diff} .
- Calculate the standardized test statistic and p-value for a paired t test for μ_{Diff} .
- State a conclusion for a paired t test for μ_{Diff} .
- Explain the relationship between a $C\%$ confidence interval and two-sided significance test with a significance level of α .
- Interpret the p-value of a significance test.
- Describe a Type I error and give a possible consequence of such an error.
- Describe a Type II error and give a possible consequence of such an error.
- Explain how sample size, significance level, standard error, and the true (alternative) value of the parameter influence the power of a test.

Unit Essential Questions:

- What is an unusual event when sampling from a population?
- What patterns occur when sampling from a population when measuring a quantitative variable?
- How is an unknown population parameter estimated?
- How is a claim about an unknown population parameter tested?

Lesson Essential Questions:

- What is the sampling distribution of a sample mean?
- How can a population mean be estimated?
- How can a population mean difference be estimated?
- What is the connection between confidence intervals and significance tests?
- How is a claim about a population mean tested?
- How is a claim about a population mean difference tested?

Materials/Resources:

Textbook

Graphing calculator

Online statistical applets (e.g. <https://www.stapplet.com/>)

Vocabulary:

Sampling distribution of the sample mean

Random condition

10% condition

Central Limit Theorem

Normal/large sample condition

t -distribution

Degrees of freedom

One-sample t interval for μ

One-sample t test for μ

Paired data

Mean difference

Difference in means

Paired t interval for μ_{Diff}

Paired t test for μ_{Diff}

Assessments:

Unit quizzes

Unit tests

Informal and formal writing assignments

Presentations

Informal check of daily assignments

Progress check (College Board)



Central York School District

AP Statistics

Grade Level: 9 – 12

Unit 4 Part 2: Inference for Two Means

Time: 5 days

Standards:

College Board 2026 CED for AP Statistics

- 4.6.A Calculate the mean and standard deviation of a sampling distribution for the difference between two sample means.
- 4.6.B Justify the appropriateness of conditions for the sampling distribution of the difference between two sample means.
- 4.6.C Interpret the mean, standard deviation, and probabilities for a sampling distribution for the difference between sample means.
- 4.7.A Identify an appropriate confidence interval procedure including the parameter for the difference between two population means.
- 4.7.B Justify the appropriateness of constructing a confidence interval for the difference between two population means by verifying conditions.
- 4.7.C Calculate an appropriate confidence interval for the difference between two population means.
- 4.7.D Calculate the standard error and margin of error for estimating the difference between two population means.
- 4.8.A Interpret a confidence interval in context for the difference between two population means.
- 4.8.B Justify a claim based on a confidence interval for the difference between two population means.
- 4.9.A Identify an appropriate testing method for the difference between two population means including the parameters for the difference between the two population means.
- 4.9.B Identify the null and alternative hypotheses for the difference between two population means.
- 4.9.C Justify the appropriateness of a hypothesis test for the difference between two population means by verifying conditions.
- 4.10.A Calculate an appropriate test statistic and p-value for testing a hypothesis for the difference between two population means.
- 4.10.B Interpret the p-value of a hypothesis test for the difference between two population means.
- 4.10.C Justify a claim about the populations based on the results of a hypothesis test for the difference between two population means.

Know:

- The sampling distribution of the difference in sample means $\bar{x}_1 - \bar{x}_2$ has mean $\mu_1 - \mu_2$ and standard deviation

$$\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}$$

- If sampling without replacement, the standard deviation of the difference in means smaller than what is given by the formula above.
- If the sample size is less than 10% of the population size, the difference between the formula and the actual standard deviation is negligible.
- The sampling distribution of the difference in means will have an approximate normal distribution, provided each sample comes from a normal population or the sample size is large (e.g. $n \geq 30$).
- Parameters for a sampling distribution for a difference of means should be interpreted using appropriate units and within the context of specific populations. The appropriate confidence interval procedure for one

quantitative variable for two independent samples is a two-sample t- interval for a difference between population means.

- In order to calculate confidence intervals to estimate a difference of population means, we must check for independence and that the sampling distribution is approximately normal.
- For the difference of two sample means, the margin of error is the critical value (t^*) times the standard error (SE) of the difference of two means.

- The standard error of $\bar{x}_1 - \bar{x}_2$ is $\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}$.

- The margin of error of $\bar{x}_1 - \bar{x}_2$ is $t^* \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}$.

- The point estimate for the difference of two population means is the difference in sample means $\bar{x}_1 - \bar{x}_2$.

- For a difference of two population means where the population standard deviations are not known, the

confidence interval is $\bar{x}_1 - \bar{x}_2 \pm t^* \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}$ where $\pm t^*$ are the critical values for the central C% of a t-distribution with appropriate degrees of freedom that can be found using technology.

- In repeated random sampling with the same sample size, approximately C% of confidence intervals created will capture the difference of population means.
- An interpretation for a confidence interval for the difference of two population means should include a reference to the samples taken and details about the populations they represent.
- A confidence interval for a difference of population means provides an interval of values that may provide sufficient evidence to support a particular claim in context.
- When all other things remain the same, the width of the confidence interval for the difference of two means tends to decrease as the sample sizes increase.
- For a quantitative variable, the appropriate test for a difference of two population means is a two-sample t-test for a difference of two population means $\mu_1 - \mu_2$.
- In order to make statistical inferences when testing a difference between population means, we must check for independence and that the sampling distribution is approximately normal.
- For a single quantitative variable, data collected using independent random samples or a randomized experiment from two populations, each of which can be modeled with a normal distribution, the sampling distribution of $\bar{x}_1 - \bar{x}_2$ is an approximate t-distribution with degrees of freedom that can be found using technology.
- An interpretation of the p-value of a significance test for a two-sample difference of population means should recognize that the p-value is computed by assuming that the null hypothesis is true.
- The results of a significance test for a two-sample test for a difference between two population means can serve as the statistical reasoning to support the answer to an investigative question about the populations that were sampled.

Understanding/Key Learning:

- Random variation may result in errors in statistical inference.
- The t-distribution may be used to model variation.
- An interval of values should be used to estimate parameters, in order to account for uncertainty.
- Significance testing allows us to make decisions about hypotheses within a particular context.

Do:

- Verify whether the conditions for the sampling distribution of a difference in means $\bar{x}_1 - \bar{x}_2$ have been met.
- Compute the mean and standard deviation of the sampling distribution of a difference in means $\bar{x}_1 - \bar{x}_2$.
- Compute probabilities of events given the sampling distribution of a difference in means

$$\bar{x}_1 - \bar{x}_2$$

- Check for independence (random and 10% conditions) and that the sampling distribution is approximately normal (Large Counts condition) before constructing a confidence interval for a difference in two population means $\mu_1 - \mu_2$.
- Calculate and interpret a two-sample t interval for $\mu_1 - \mu_2$.
- State hypotheses for a significance test about a difference in two population means $\mu_1 - \mu_2$.
- Check for independence (random and 10% conditions) and that the sampling distribution is approximately normal (Large Counts condition) before performing a significance test about a difference in two population means $\mu_1 - \mu_2$.
- Calculate the standardized test statistic and p-value for a two-sample t test for $\mu_1 - \mu_2$.
- State a conclusion for a two-sample t test for $\mu_1 - \mu_2$.
- Explain the relationship between a $C\%$ confidence interval and two-sided significance test with a significance level of α .
- Interpret the p-value of a significance test.
- Describe a Type I error and give a possible consequence of such an error.
- Describe a Type II error and give a possible consequence of such an error.
- Explain how sample size, significance level, standard error, and the true (alternative) value of the parameter influence the power of a test.

Unit Essential Questions:

- What is an unusual event when sampling from a population?
- What patterns occur when sampling from two populations when measuring quantitative variables?
- How is an unknown difference in population parameters estimated?
- How is a claim about an unknown difference in population parameters tested?

Lesson Essential Questions:

- What is the sampling distribution of a difference in sample means?
- How can a difference in two population means be estimated?
- How can a claim about a difference in two population means be tested?

Materials/Resources:

Textbook

Graphing calculator

Online statistical applets (e.g. <https://www.stapplet.com/>)

Vocabulary:

Difference in means	Two-sample t interval for $\mu_1 - \mu_2$	Two-sample t test for $\mu_1 - \mu_2$
Sampling distribution of a difference in means		

Assessments:

Unit quizzes

Unit tests

Informal and formal writing assignments

Presentations

Informal check of daily assignments

Progress check (College Board)



Central York School District

AP Statistics

Grade Level: 9 – 12

Unit 5: Regression Analysis

Time: 5 days

Standards:

College Board 2026 CED for AP Statistics

- 5.1.A Construct scatterplots depicting the relationship between two quantitative variables.
- 5.1.B Describe the characteristics of a scatterplot.
- 5.1.C Justify a claim using scatterplots depicting the relationship between two quantitative variables.
- 5.2.A Interpret the correlation for a linear relationship.
- 5.3.A Calculate a predicted response value using a linear regression model.
- 5.4.A Calculate the differences between the observed and predicted values.
- 5.4.B Interpret the differences between the observed and predicted values.
- 5.4.C Describe the form of association of bivariate data using residual plots.
- 5.5.A Calculate the coefficients for the least-squares regression line model.
- 5.5.B Interpret coefficients for the least-squares regression line model.

Know:

- Apparent patterns and associations in data may be random or not.
- A bivariate quantitative data set consists of observations of two different quantitative variables made on individuals in a sample or population.
- An explanatory variable is a variable whose values are used to explain or predict corresponding values for the response variable.
- The direction of the association shown in a scatterplot, if any, can be described as positive or negative.
- A positive association means that as values of one variable increase, the values of the other variable tend to increase.
- A negative association means that as values of one variable increase, values of the other variable tend to decrease.
- The form of the association shown in a scatterplot, if any, can be described as linear or non-linear to varying degrees.
- The strength of the association is how closely the individual points follow a specific pattern, e.g., linear, and can be shown in a scatterplot.
- Strength can be described as strong, moderate, or weak.
- Unusual features of a scatter plot include clusters of points or points with relatively large discrepancies between the value of the response variable and a predicted value for the response variable.
- The correlation, r , gives the direction and quantifies the strength of the linear association between two quantitative variables.
- A correlation coefficient close to 1 or -1 does not necessarily mean that a linear model is appropriate.
- The correlation, r , is unit-free.
- The correlation, r , is between -1 and 1 , inclusive.
- A value of $r = 0$ indicates that there is no linear association.
- A value of $r = 1$ or $r = -1$ indicates that there is a perfect linear association.
- A perceived or real relationship between two variables does not mean that changes in one variable cause changes in the other. That is, association does not necessarily imply causation.
- A simple linear regression model is an equation that uses an explanatory variable, x , to predict the response

variable, y .

- The predicted response value, denoted by $\hat{y}$, is calculated as $\hat{y} = a + bx$.
- a is the y -intercept of the regression line.
- b is the slope of the regression line.
- Extrapolation is predicting a response value using a value for the explanatory variable that is beyond the interval of x -values used to determine the regression line.
- The residual is the difference between the actual value and the predicted value.
- A residual plot is a plot of residuals versus explanatory variable values or predicted response values.
- Apparent randomness in a residual plot for a linear model is evidence of a linear form to the association between the variables.
- The least-squares regression model minimizes the sum of the squares of the residuals.
- The least-squares regression model contains the point $(\bar{x}, \bar{y})$.
- The slope is the amount that the predicted y -value changes for every unit increase in x .
- The y -intercept value is the predicted value of the response variable when the explanatory variable is equal to 0.

Understanding/Key Learning:

- Given that variation may be random or not, conclusions are uncertain.
- Graphical representations and statistics allow us to identify and represent key features of data.
- Regression models may allow us to predict responses to changes in an explanatory variable.

Do:

- Construct a scatterplot.
- Describe the association between two variables in a scatterplot.
- Interpret a correlation coefficient r .
- Compute a least-squares regression equation.
- Predict a value of the response variable using a least-squares regression equation.
- Compute and interpret a residual.
- Interpret the slope b of a least-squares regression equation.
- Interpret the y -intercept a of a least-squares regression equation.
- Sometimes, the y -intercept of the line does not have a logical interpretation in context.
- Investigate the appropriateness of a selected model using a residual plot.
- Interpret the coefficient of determination r^2 .

Unit Essential Questions:

- Is there an association between two quantitative variables?
- How can the association between two quantitative variables be measured?
- How can associations between variables be used to make predictions?

Lesson Essential Questions:

- How are data from two quantitative variables organized?
- Is there an association between two quantitative variables?
- Can the relationship between two quantitative variables be modeled?
- Is the least-squares regression model adequate?
- How is the least-squares regression model interpreted?

Materials/Resources:

Textbook

Graphing calculator

Online statistical applets (e.g. <https://www.stapplet.com/>)

Vocabulary:

Explanatory variable
Response variable

Scatterplot
Direction
Form
Strength
Correlation coefficient

Least squares regression
line
Slope coefficient
Intercept coefficient
Residual
Residual plot

Coefficient of
determination

Assessments:

Unit quizzes
Unit tests
Informal and formal writing assignments
Presentations
Informal check of daily assignments
Progress check (College Board)

**CENTRAL YORK SCHOOL DISTRICT
CONFERENCE/WORKSHOP LIST**

OCTOBER 2026

DATE	EVENT TITLE	EVENT LOCATION	PERSON ATTENDING	BLDG	SUB NEEDED	REG COST	FLIGHT COST	LODGING COST
10/07/26	Establishing Component Skills Thought Evidence Based Practices	Harrisburg, PA	Christyna Berry April Campbell	RT HS	Y N	\$0.00	\$0.00	\$0.00
10/07/26 – 10/09/26	Safety Care Trainer Initial Certific	Lancaster, PA	Jennifer Leese	SpEd	N	\$2,599.00	\$0.00	\$0.00
10/13/26	CHS Meeting	Pittsburg, PA	Lacey Fedorko	HS	Y	\$205.20	\$0.00	\$385.00
10/14/06 – 10/16/26	Alg 1 Keystone Standards Validation Committee	Hershey, PA	Trina Pierce	MS	Y	\$0.00	\$0.00	\$0.00
10/15/26 – 10/16/26	2026 PCEA Conference	State College, PA	Matthew Astrorino	HS	Y	\$300.00	\$0.00	\$176.00
10/29/26	Workshop for H/PE Educators	New Oxford, PA	Jessica Rineer	MS	Y	\$0.00	\$0.00	\$0.00
11/06/26	Structure Literacy Consideration for Multilingual Learners 3 Part Series	New Oxford, PA	Elizabeth Goheen	MS	Y	\$0.00	\$0.00	\$0.00

**CENTRAL YORK SCHOOL DISTRICT
CONFERENCE/WORKSHOP LIST**

OCTOBER 2026

DATE	EVENT TITLE	EVENT LOCATION	PERSON ATTENDING	BLDG	SUB NEEDED	REG COST	FLIGHT COST	LODGING COST
11/10/26	ELD Onboarding Cohort 4 Sessions	New Oxford, PA	Elizabeth Goheen	MS	Y	\$0.00	\$0.00	\$0.00



PSBA Human Resource SERVICES

Proposal prepared for:

Central York School District

Presented by the Pennsylvania School Boards Association



CENTRAL YORK
SCHOOL DISTRICT

EMPOWERING

your school district and the professionals who lead it.

Your PSBA Human Resources Service team members:

Dr. Britta Barrickman
Chief Impact Officer
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Introducing the Pennsylvania School Boards Association as your Human Resource Services Provider

You have known and trusted **PSBA** as your association—dedicated to furthering the highest ideals of local lay leadership for the public schools of the Pennsylvania Commonwealth. Through 128 years of history in our supporting role, we have progressed and evolved our service areas, training and tools to continue meeting the needs of school boards and district administration.

Changing times and new demands on school leaders are what we are accustomed to addressing—we grow so that you can perform your job governing school districts effectively, and for the betterment of your community. We work hard to support you so you can focus on supporting your students.

Since its founding, **PSBA** has committed to supporting public education excellence in Pennsylvania. Our commitment to you is to provide the highest caliber of service possible and to conduct ourselves as partners, an extension of the district, contributing unfailing professionalism and keen insights.

In all areas of contribution to our school districts, we abide by our adopted PSBA Values:

- » **Honesty & Integrity**
- » **Member Focus**
- » **Working Together**
- » **Innovation**

Strategies for Addressing Compensation Issues

For more than 25 years, the Pennsylvania School Boards Association has been the industry leader in providing compensation services to school districts and intermediate units throughout Pennsylvania. With 128 years of history as the first school boards association in the nation, PSBA has depth of knowledge around every aspect of school district operations that cannot be compared or rivaled.

In choosing **PSBA** to provide compensation services, rest assured, you have joined with school districts throughout Pennsylvania who are committed to equitable employee compensation at the most affordable cost to the taxpayers. This proposal will give you a comprehensive overview of the elements of compensation services we are proud to offer.

Why choose PSBA?

Beyond the 128 years of knowledge and expertise in all that concerns school boards...

- » We have the most comprehensive and reliable database in the commonwealth. We use historic, time-adjusted and current datasets to develop salary and hourly rate ranges.
- » We stay with you, remaining engaged beyond the conclusion of the study to provide compensation study updates.
- » **PSBA** stays abreast of changing trends and practices, maintaining relationships with professional compensation societies such as WorldatWork. This ensures that our compensation professionals continue to enhance their expertise, which ensures you're receiving the highest caliber of services.

Background

School districts and intermediate units are continually challenged with decisions concerning how to effectively spend administrative and/or support staff pay dollars, motivate employees through compensation, and meet other employee expectations. The **PSBA** Human Resource team can alleviate these concerns by assisting your organization in the development of a compensation plan for your school district. This service is available for both administrative and support staff employees.

PSBA has created a compensation program that addresses the compensation challenges identified by the district, and we have incorporated dependable compensation methodologies with current pay rate information from school districts.

PSBA welcomes the opportunity to partner with you on this significant initiative. Our promise to you is that we will bring the highest standards of professionalism and expertise to the compensation products and services we provide your district.



COMPENSATION ANALYSIS AND MARKET ASSESSMENT

Scope of the Work

PSBA will conduct an analysis of the internal equity and external competitiveness of the school districts' administrative staff (approximately 34 employees/22 positions) and support staff (approximately 284 employees/31 positions) groups compensation practices. This service includes an analysis of the current compensation structure and an analysis of the competitive external market. An objective presentation including the findings of the study will be provided.

- » **Position Evaluation:** **PSBA** will evaluate position descriptions identified for an internal equity assessment utilizing a point factor method evaluation tool developed specifically to assess positions in public schools in the commonwealth. **Note:** *This is an evaluation of the duties and responsibilities of the position and is not an evaluation of the performance of an incumbent.*
- » **Market Analysis:** **PSBA** will review available salary surveys and current market data and will calculate salary ranges with the necessary minimum, midpoint and maximum.
- » **Compensation Study:** **PSBA** will perform a statistical analysis to determine the comparative relationship between district salaries and the market survey.
- » **Board Presentation:** **PSBA** will prepare a presentation of findings and appropriate interpretive analysis reflecting the comparisons. As part of the presentation, PSBA will discuss strategies to align the results of the study with the compensation philosophy of the district.

Expense to District

September 8, 2026

The cost to fulfill this compensation study: \$9,200.

The fee shall be divided into the following two billing stages:

Billing Stage	Percent of Total Cost	Amount
Selection	50%	\$4,600
Project Completion	50%	\$4,600

Additional Services & Expense

The fee set forth in this proposal is based on the number of positions and people involved in the process as represented to **PSBA**, as well as the labor time required to synthesize market data, to consult on the program and to make final recommendations. Should the scope of work change significantly during the course of this study at the request of the school district, such that more than five additional positions are added to the study or the time required to complete the work is extended by a request made by the school district, **PSBA** reserves the right to negotiate an additional fee to complete the additional work.



Communicating the Results

PSBA has always maintained that compensation studies are ‘proprietary’ and to be used exclusively by the school district who commissioned the study. A document considered proprietary limits the audiences who can see the contents. The compilation of compensation methodologies and the resulting study become proprietary because the compilation of work relates to the strategic business and educational interests of the district who commissioned the study.

Studies are conducted so districts can determine how to fairly compensate employees, develop strategies to recruit and retain staff members, and execute the operational goals of the district. Compensation studies containing information that confers some sort of economic benefit and/or strategic advantage to the holder could be erroneously duplicated by other districts for their use.

The study serves as pre-decisional information and should be considered with other sources of confidential information. Because districts are not required to divulge records produced or commissioned to establish salaries of negotiations with bargaining unit employees, **PSBA** has always held that compensation studies should serve the same purpose – important information used by the district to establish salaries considering other issues informing the same decision.

Compensation Studies and Effective School Governance

The final ‘product’ reflects the culmination of research conducted by **PSBA** in concert with your district. However, the study should never serve prescriptive or sole source of consideration. All decisions related to the compensation of employee’s rests solely with the board of school directors, and the study should serve as one resource in making an informed and objective decision. The study does not carry the same ‘weight’ as a collective bargaining agreement, which is a binding legal document ratified by both parties. The results of the study need to be analyzed closely, while recognizing other critical factors facing your district. Those factors often include the overall financial health of the district, the current tax effort in the community, the state of the economy, and other important district-wide investments including (but not limited to) technology upgrades, curriculum and professional development initiatives, and building/renovation projects. **PSBA** has always advocated for local control. We believe you know your district best. Therefore, it is our belief that the study should not serve as the district’s decision, but rather, it should serve as one source of information that informs and guides the board’s deliberations on compensation matters.



SPONSORSHIP AGREEMENT

THIS SPONSORSHIP AGREEMENT (“Sponsorship Agreement”) is made and entered into by Central York School District (“School District”), a school district with administrative offices at 775 Marion Road, York, PA 17406, and Pizza al Bacio (“Sponsor”), with an address of 555 Ryan Run Rd, York, PA 17404.

Background

The School District’s Board of School Directors has adopted a policy governing the promotion, display, and sale of commercial products as well as advertisements promoting commercial interests on School District property and within School District buildings. In accordance with such policy, the School District has developed an approved form Sponsorship Agreement providing for commercial advertising by groups, businesses and companies on School District property in exchange for the payment of sponsorship fees. The goal of such Sponsorship Agreements is to benefit students and taxpayers by generating private financial support for the School District and its educational programs.

Now, therefore, with the intent to be legally bound, the parties hereto agree as follows:

Terms and Conditions

1. **Promotional Rights, Sponsorship Fees and Time Frame.** Subject to the terms and conditions of this Sponsorship Agreement, the School District hereby grants and sells to Sponsor, and Sponsor hereby purchases and accepts from the School District, certain commercial sponsorship rights for a specified period of time in exchange for the payment of sponsorship fees by Sponsor, as described in Appendix A attached hereto and incorporated herein.
2. **Term.** The term of this Sponsorship Agreement shall be for a period of three (3) years commencing on October 1, 2026 and ending on September 30, 2029 unless terminated sooner in accordance with provisions of this Sponsorship Agreement. Either party may terminate this Agreement without penalty or charge upon reasonable prior written notice to the other party. In the event either party terminates this Agreement prior to the conclusion of the sponsorship commitment period, the School District shall return a pro-rata portion of any sponsorship funds paid for the unexpired portion of the sponsorship period. In the event of early termination, any static display previously installed under this Agreement shall be promptly removed and other benefits returned or rescinded.
3. **Responsibility for Advertising.** The parties have the following responsibilities regarding advertising materials under this Sponsorship Agreement:

- a. **Sponsor.** Sponsor is responsible for procuring and supplying the content, layout and design of all advertising materials contemplated by this Sponsorship Agreement and for submitting all such materials to School District for approval as required by Section 8 below.
 - b. **School District.** The School District shall be responsible to install, maintain and remove all displays, advertisements or other promotional materials required as part of this Sponsorship Agreement. All advertising materials that are damaged must be replaced, repaired or removed in a timely fashion by the School District.
- 4. **Sponsorship Fees.** This Sponsorship Agreement shall identify the following with respect to sponsorship fees paid by the Sponsor: (i) the total amount of the sponsorship fees to be paid by the Sponsor, (ii) the amount and timing of payments to be made by Sponsor. The School District shall prepare and submit invoices in a timely manner to Sponsor for payment and collection of the sponsorship fees as set forth in Appendix B, attached hereto and incorporated herein.
- 5. **Mandatory Conditions Applicable to Advertising.** All advertising associated with this Sponsorship Agreement shall comply with the following conditions:
 - a. Advertising will not be displayed inside classrooms or in any other area that may be disruptive to student learning. For purposes of this section, the term “classroom” does not include any school’s auditorium, cafeteria, gymnasium, library, performing arts center or athletic fields/facilities.
 - b. Advertisements shall not be disruptive or jeopardize the safety of students, staff and/or the public by their content or physical properties.
 - c. Advertising must comply with all laws, regulations and administrative agency rules of the federal, state and local governments, including those applicable to intellectual property rights (such as copyrights, trademarks, trade names and patents).
 - d. No sponsor shall be permitted to use the School District’s intellectual property (i.e. team names, slogans, logos, or designs constituting trademark or service marks whether or not registered) unless such use is identified in an approved Sponsorship Agreement or approved in writing by the School District.
 - e. Advertising must be in compliance with all School District policies, procedures, rules and guidelines, including those specifically applicable to Sponsorship Agreements and non-discrimination, and sponsor agrees it has had opportunity to request and review such policies, procedures, rules and guidelines.

6. Provisions Regarding Advertising Copy and Signage

- a. **Preparation.** Unless otherwise provided in Appendix A, Sponsor shall be responsible, at its sole cost and expense, for the design of all advertising copy to be used pursuant to this Sponsorship Agreement.
- b. **Installation and Removal of Advertising Signage.** The School District shall be responsible for the cost of the initial Production, install and removal of all advertising signage.
- c. **Maintenance.** Following initial installation of advertising signage, the School District shall be responsible for maintaining the signage in good and attractive order, repair and condition throughout the term identified in Appendix A hereto.
- d. **Display.** All advertising signage provided for in this Sponsorship Agreement shall be displayed during all events open to the general public held at the locations specified in Appendix A during the term of this Sponsorship Agreement, unless such advertising is prohibited for a specific event by federal, state or local laws, or regulations. Except as otherwise provided in the immediately preceding sentence, no advertising signage shall be removed, covered, or intentionally obstructed for any purpose during an event (other than an obstruction caused solely by the erection of facilities or equipment necessary for the conduct or performance of an event) without the prior written consent of Sponsor.
- e. **Installation of Replacement Advertising Signage.** Sponsor shall have the right to have School District replace advertising signage during the term of this Sponsorship Agreement, at the Sponsor's sole cost and expense, subject to the replacement signage being of the same size and character as the original signage and the School District's right of approval pursuant to Section 8 below.

7. Approval of Advertising Copy. The design, layout, elevation, configuration, and content of all advertising copy displayed pursuant to this Sponsorship Agreement shall be subject to the School District's approval. The School District may find advertising copy to be unacceptable if in good faith it determines that the advertising copy (i) violates any requirements of this Sponsorship Agreement, (ii) is of substandard technical quality, (iii) does not conform to School District's previously stated design preferences, (iv) is not commercial in nature, (v) is not in keeping with standards of good taste, (vi) is not appropriate for school-aged children, or (vii) seeks to promote, encourage or engage in any of the following:

- a. Support any non-commercial message or position
- b. Make false, misleading, deceptive or unwarranted statements or claims
- c. Infringe upon another persons' rights through plagiarism, unfair imitation of another person's program idea or copy, or any other unfair competition
- d. Disparage a competitor or a competitor's products or services

- e. Contain slanderous, obscene, sexual, profane, vulgar, repulsive, or offensive matters, either in theme or in treatment
- f. Appeal for funds
- g. Contain testimonials that cannot be authenticated
- h. Declare or imply an endorsement by the School District of any service, product or point of view
- i. Promote the sale or use of alcohol or tobacco products, or
- j. Promote unlawful or illegal goods, services or activities

Sponsor shall have the right to modify advertising copy throughout the term of this Sponsorship Agreement, subject to the School District's right of approval pursuant to the foregoing process and standards.

8. **Retained Rights to Intellectual Property.** Sponsor's intellectual property displayed on its advertising copy, and all trademark rights or copyrights in such advertising copy, shall be and remain the sole and exclusive property of Sponsor. Throughout the term of this Sponsorship Agreement, Sponsor grants the School District a non-exclusive limited license to publish, distribute and display Sponsor's intellectual property on advertising copy or on any other items or materials consistent with the terms and purposes of this Sponsorship Agreement.

Any and all advertising or promotional material displayed or distributed by Sponsor pursuant to this Sponsorship Agreement in conjunction with the School District intellectual property (i.e. displaying School District's name, logos, trademarks, or service marks) shall be subject to the prior written approval of School District, and, if approved, shall be subject to the grant of a non-exclusive limited license that automatically expires upon the expiration or termination of this Sponsorship Agreement. The School District's intellectual property (including without limitation any such intellectual property that is displayed in Sponsor's advertising copy with the permission of the School District) shall be and remain the sole and exclusive property of the School District.

No party shall have the right to use in any way or reproduce for any purpose the corporate or trade names, trademarks, service marks, logos, or other proprietary symbols of another party to this Sponsorship Agreement without that party's prior written consent.

9. **School District Approval Required for any On-Site Promotional Activity.** Any promotional activity (including presentations or programs) on School District Property requested by the Sponsor should be identified in Appendix A, so that it may be approved as part of this Sponsorship Agreement. Sponsor shall not engage in promotional activity on School District property that is not expressly identified in Appendix A without written consent by the School District, which shall have sole discretion on whether to approve such activity.

10. **“Make Good” Activity.** If an advertising or promotional activity identified in Appendix A does not occur as contemplated due to unforeseen circumstances or events beyond the control of School District or the Sponsor, the parties may mutually agree upon a “make good” advertising or promotional activity to compensate for the non-occurrence of the scheduled activity. A “make good” activity must be scheduled to occur during the term of this Agreement.
11. **Termination.** If a party breaches its obligation hereunder, the non-breaching party shall have the option to immediately cease all performance under this Sponsorship Agreement and (without prejudice to any other legal rights) may terminate this Sponsorship Agreement if such breach is not cured within fifteen (15) days of its receipt of notice by the non-breaching party. Further, the School District reserves the right to terminate this Sponsorship Agreement without cause if its Board of School Directors determines, in its sole discretion, that terminating the contract is in the best interest of the School District. Should the School District terminate the contract without cause, the School District shall return to Sponsor the prorated amount of sponsorship fees paid for the current contract year.
12. **Release, Indemnification, No Representation**
- a. **By Sponsor.** Sponsor hereby assumes full and complete responsibility and liability for the content of all its advertising copy, and for all other work performed or required to be performed by Sponsor under this Sponsorship Agreement and agrees that all of the foregoing shall be at Sponsor’s sole risk. Sponsor agrees to defend, indemnify, and hold harmless the School District (including its present and future board members, officers, administrators, employees, stakeholders, other representatives, successors, and assigns and their respective subsidiaries, affiliates, partners, officers, directors, employees, stakeholders, shareholders, agents, other representatives, successors and assigns) from and against any and all losses, liabilities, damages, claims, demands, suits, and judgments (including, without limitation, attorneys’ fees and the costs of any legal action) arising out of (i) the use of any trademark, service mark, logo, design, and other intellectual property right materials provided by Sponsor, (ii) the character, content, and subject matter of any advertising copy displayed by Sponsor, (iii) the design of Sponsor’s advertising or signage; and (iv) any breach of this Sponsorship Agreement by Sponsor. Sponsor fully and forever waives, discharges, and releases the School District from any and all losses, liabilities, damages, claims, demands, suits, and judgments (including without limitation, attorneys’ fees and the costs of any legal action) arising out of or related to any matter described in clauses (i) and (iv) above.

- b. **No Oral or Implied Representations.** Sponsor acknowledges that all terms and conditions of this Sponsorship Agreement are in writing as fully set forth in this document and Appendix A attached hereto. The School District shall not be bound by any oral or implied agreements, warranties or representations purportedly made to Sponsor by the School District.
13. **Assignment.** Sponsor shall not have the right or power to assign any of their rights or obligations under this Sponsorship Agreement to any other party without the prior written consent of the School District in its sole discretion. The School District shall not assign any of its rights or obligations under this Sponsorship Agreement to any other party without the prior written consent of Sponsor. Subject to the foregoing, this Sponsorship Agreement shall be binding upon and shall inure to the benefit of the parties and their permitted successors and assigns.
14. **Governing Law.** The validity, interpretation and performance of this Sponsorship Agreement shall be governed by and construed in accordance with the laws of the Commonwealth of Pennsylvania, without regard to conflict-of-law principles. The parties agree the exclusive venue for any legal proceedings that may be instituted by the parties in connection with this Sponsorship Agreement shall be in the York County Court of Common Pleas.
15. **Force Majeure.** Both parties shall be excused from non-performance of obligations hereunder in the event of a Force Majeure. A Force Majeure event shall mean and include any event or cause beyond a party's reasonable control (including, but not limited to fire, flood, pandemic, explosions, damage by third parties, whether negligently or intentionally caused, strikes, work stoppages, picketing, lockouts and/or any other concerted action by any employees or any labor organization, acts of God or other casualties, the laws or actions of any governmental authority, or any other event or cause that is beyond a party's reasonable control), which renders a party unable to fulfill its obligations pursuant to this Sponsorship Agreement.
16. **Notices.** All notices or other communications that are required or contemplated by this Sponsorship Agreement shall be in writing and delivered at the addresses identified in the opening paragraph hereof unless otherwise directed by a party. All notices concerning termination of this Sponsorship Agreement shall be sent by United States certified or registered mail, return receipt requested, or by any other means of delivery that generates a signed receipt.
17. **Merger Clause.** This Sponsorship Agreement (including any attached exhibits) is the final, complete, and exclusive statement and expression of the agreement among the

parties hereto with relation to the subject matter hereof, it being understood that there are no oral representations, understandings, or agreements covering the same subject matter as this Sponsorship Agreement. This Sponsorship Agreement supersedes and cannot be varied, contradicted, or supplemented by evidence of any prior or contemporaneous discussions, correspondence, or oral or written agreement of any kind.

18. **Representations and Warranties of Sponsor.** Sponsor does hereby represent and warrant that it owns or has the right to use all trademarks, brand logos, label designs, product identification, decals, and artwork displayed in its advertising copy and on signage to be displayed pursuant to this Sponsorship Agreement.
19. **No Waiver.** No delay of or omission in the exercise of any right, power, or remedy accruing to any party under this Sponsorship Agreement shall impair any such right, power, or remedy, nor shall it be construed as a waiver of any future exercise of any right, power, or remedy.
20. **Severability.** In case any provision of this Sponsorship Agreement shall be invalid, illegal, or unenforceable, such provision shall be severed from this Sponsorship Agreement. The validity, legality, and enforceability of the remaining provisions of this Sponsorship Agreement shall not in any way be affected or impaired thereby.
21. **Counterparts.** This Sponsorship Agreement may be executed in any number of counterparts, each of which shall be an original, and all of which shall be deemed to be one and the same instrument.

IN WITNESS WHEREOF, the parties have caused this Sponsorship Agreement to be duly executed by an authorized representative as of the day and year first written above.

SPONSOR: Pizza al Bacio

By: _____

Date:

Title: _____

CENTRAL YORK SCHOOL DISTRICT

By: _____

Date:

Title: _____

APPENDIX A

COMPREHENSIVE SPONSORSHIP PACKAGE

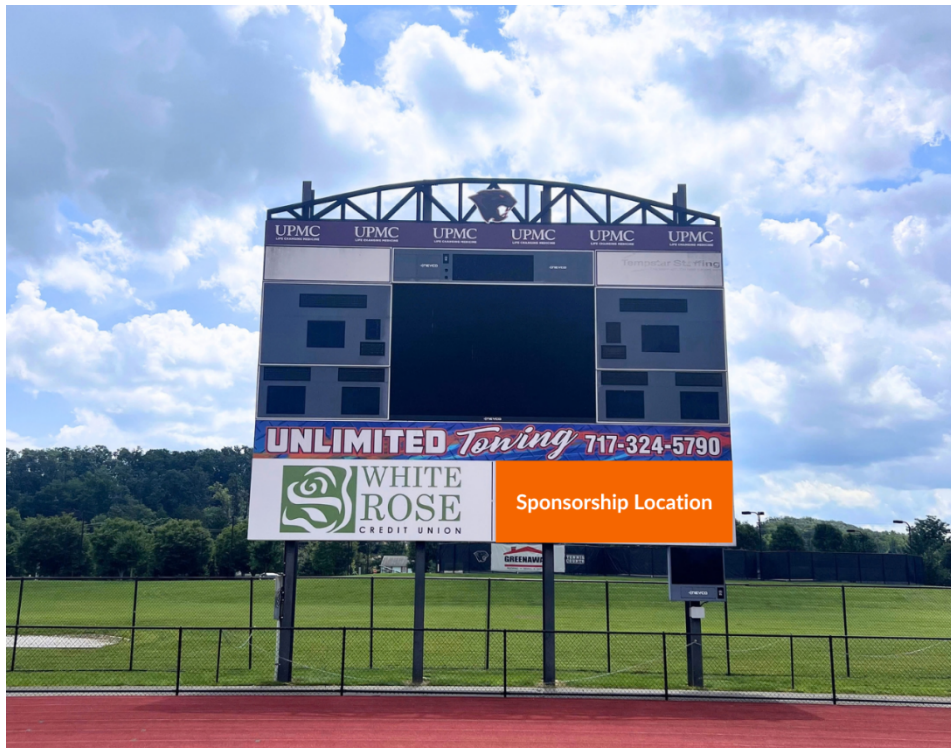
Panther Partnership Perks

- Logo placement and website link on the Panther Partnership portion of the District Website
- Social Media announcement recognizing your organization as a Panther Partner
- PA recognition during Central York Athletic Events
- Invitation to set up marketing table at any Central York home sporting event and select performances
- Behind-the-scenes tour of Panther Stadium and District facilities for your team
- Panther Partner signage to display at your business
- Invitation to set up a display at the District's Opening Day event
- Sponsor name included on a rotating Panther Partner recognition slide displayed on select digital screens during Central York events (stadium, gymnasium, natatorium)
- Annual District social media post listing all sponsors

Asset Specs

Bottom Right Scoreboard Panel at Panther Stadium

- 18'w x 6'h



APPENDIX B

PAYMENT SCHEDULE

Monthly Installments

Year 1: October 1, 2026 – September 30, 2027

- October 2026 – August 2027: Eleven (11) monthly payments of \$333.33
- September 2027: One (1) payment of \$333.37
- Annual Total: \$4,000.00

Year 2: October 1, 2027 – September 30, 2028

- October 2027 – August 2028: Eleven (11) monthly payments of \$333.33
- September 2028: One (1) payment of \$333.37
- Annual Total: \$4,000.00

Year 3: October 1, 2028 – September 30, 2029

- October 2028 – August 2029: Eleven (11) monthly payments of \$333.33
- September 2029: One (1) payment of \$333.37
- Annual Total: \$4,000.00



BOARD POLICY

621 Local Taxpayer Bill of Rights Draft 4

7.25.26

POLICY NUMBER	VERSION	DOCUMENT STATUS	PRINTED
621	v1.9	DRAFT	9/10/2026

Purpose

As a local taxing authority, the Board recognizes the school district's responsibility to comply with the requirements of applicable law.^[1]

Definition

Eligible taxes shall be defined as all non-real estate taxes, including per capita; occupation, occupation assessment and occupation privilege; income and net profits; business gross receipts; privilege; amusements or admissions; and any other tax authorized by the Local Tax Enabling Law.^[3] ^[7]

Authority

The Board shall adopt a Local Taxpayer Bill of Rights that includes the following components in simple and nontechnical terms:^[4]

1. Taxpayer rights and the district's obligation during an audit or administrative review of the taxpayer's books or records.
2. Administrative and judicial procedures for a taxpayer to appeal or seek review of any adverse tax decision.
3. Procedures for filing and processing refund claims and taxpayer complaints.
4. Enforcement procedures.

Delegation of Responsibility

The administrator designated by the Board shall ensure that taxpayers are notified about the district's Local Taxpayer Bill of Rights any time they are contacted regarding assessment, audit, determination, review and collection of any tax other than property taxes.[4]

It shall be the responsibility of the Superintendent, Chief Financial Officer Business Manager, and/or other designated school district employee to develop procedures to implement this policy which shall include:

1. Preparation of a Local Taxpayer Bill of Rights.
2. Preparation and dissemination of the required notice of availability of the Local Taxpayer Bill of Rights.
3. Preparation of a procedure for the district to request information from a taxpayer.
4. Establishment of an administrative appeals process.
5. Development of the form, content, process and deadlines for taxpayers to file a tax appeal petition.
6. Formulation of rules of practice and procedure for hearings.

The Superintendent or designee shall ensure that taxpayers are notified about the District's Local Taxpayer Bill of Rights anytime they are contacted regarding assessment, audit, determination, review, and collection of any tax other than property taxes.[4]

The district shall respond to taxpayer requests for the Local Taxpayer Bill of Rights by making copies available at the district offices or mailing at district expense.[4]

Guidelines

Information obtained by the school district as a result of an audit, return, report, investigation, hearing or verification shall be confidential. If a violation of confidentiality is committed by a District Employee, officer or member of the Board, they may shall be subject to fines and dismissal from office or discharge from employment.[5]

Appeals Process

The =Business Manager shall serve as the hearing officer and —The District establishes the following as the administrative process to receive and make determinations on petitions from taxpayers relating to assessment, determination or refund of an eligible tax:[6]

The District establishes the following as the administrative process to receive and make determinations on petitions from taxpayers relating to assessment, determination or refund of an eligible tax. The Board hereby appoints the Chief Financial Officer to serve as a hearing officer for the purpose of conducting hearings and making decisions on appeals. Where a taxpayer is dissatisfied with the results of the hearing, an appeal can be made to the appropriate court^{[5][6]}.

[9]

1. A hearing and decision by a hearing officer appointed by the Board. The Board hereby appoints the Chief Financial Officer to serve as the hearing officer or;
2. A hearing which will take place in the Board's Executive Session at which time the taxpayer may present their case to the full Board.^[8]

Legal Footnotes

[1] 53 Pa. C.S.A. 8401
LEGAL REFERENCE

[3] 53 Pa. C.S.A. 8422
LEGAL REFERENCE

[4] 53 Pa. C.S.A. 8423
LEGAL REFERENCE

[5] 53 Pa. C.S.A. 8437
LEGAL REFERENCE

[6] 53 Pa. C.S.A. 8430
LEGAL REFERENCE

[7] 53 P.S. 6924.101
LEGAL REFERENCE

[9] 42 Pa. C.S
LEGAL REFERENCE

Legal References

No additional references listed.