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| **Grade Level**  10th-12th | | **Teacher/Room**: LPAYNE/181 Week of: FEB 1-FEB 5 | | | |
| **Unit Vocabulary: Chapter 2-** z-scores, percentiles, mean, standard deviation, normal curve, 68-95-99rule, density curve, normal distribution, normal probability plot **Chapter 3**- See attached | | | | | |
| **Instructional Strategies Used:** direct instruction, independent study, interactive instruction, activities, case studies, case closed, data exploration**.**  **LESSON PLANS ARE SUBJECT TO CHANGE DAILY!** | | | | | |
| **Day 1** | **Day 2** | | **Day 3** | **Day 4** | **Day 5** |
| **Common Core Standard(s)**:  **S.ID.4. Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.** | **GSE/GPS Standard(s)**:  Describe why it is important to investigate relationships between variables. • Identify explanatory and response variables in situations where one variable helps to explain or influence the other. • Make a scatterplot to display the relationship between two quantitative variables. • Describe the direction, form, and strength of the overall pattern of a scatterplot. • Recognize outliers in a scatterplot. • Know the basic properties of correlation. • Calculate and interpret correlation in context. • Explain how the correlation r is influenced by extreme observations. | | **GSE/GPS Standard(s)**:  Describe why it is important to investigate relationships between variables. • Identify explanatory and response variables in situations where one variable helps to explain or influence the other. • Make a scatterplot to display the relationship between two quantitative variables. • Describe the direction, form, and strength of the overall pattern of a scatterplot. • Recognize outliers in a scatterplot. • Know the basic properties of correlation. • Calculate and interpret correlation in context. • Explain how the correlation r is influenced by extreme observations. | **GSE/GPS Standard(s)**:  Describe why it is important to investigate relationships between variables. • Identify explanatory and response variables in situations where one variable helps to explain or influence the other. • Make a scatterplot to display the relationship between two quantitative variables. • Describe the direction, form, and strength of the overall pattern of a scatterplot. • Recognize outliers in a scatterplot. • Know the basic properties of correlation. • Calculate and interpret correlation in context. • Explain how the correlation r is influenced by extreme observations. | **GSE/GPS Standard(s)**:  Describe why it is important to investigate relationships between variables. • Identify explanatory and response variables in situations where one variable helps to explain or influence the other. • Make a scatterplot to display the relationship between two quantitative variables. • Describe the direction, form, and strength of the overall pattern of a scatterplot. • Recognize outliers in a scatterplot. • Know the basic properties of correlation. • Calculate and interpret correlation in context. • Explain how the correlation r is influenced by extreme observations. |
| **EQ Question:**  How does one assess normality? • Why is the normal distribution essential to the study of statistics? • How does the normal distribution apply to the real world? | **EQ Question:**  What does it mean to regress? • What is association? What is correlation? How are they connected? • Does association imply causation? • How can modeling data help us to understand patterns? • Can we use extrapolation to predict the future? • What is the best evidence for causation? • Is it possible to test for lack of correlation? • How do patterns affect your life? | | **EQ Question:**  What does it mean to regress? • What is association? What is correlation? How are they connected? • Does association imply causation? • How can modeling data help us to understand patterns? • Can we use extrapolation to predict the future? • What is the best evidence for causation? • Is it possible to test for lack of correlation? • How do patterns affect your life? | **EQ Question:**  What does it mean to regress? • What is association? What is correlation? How are they connected? • Does association imply causation? • How can modeling data help us to understand patterns? • Can we use extrapolation to predict the future? • What is the best evidence for causation? • Is it possible to test for lack of correlation? • How do patterns affect your life? | **EQ Question:**  What does it mean to regress? • What is association? What is correlation? How are they connected? • Does association imply causation? • How can modeling data help us to understand patterns? • Can we use extrapolation to predict the future? • What is the best evidence for causation? • Is it possible to test for lack of correlation? • How do patterns affect your life? |
| **Mini Lesson:**  Check homework and answer any questions  STUDENT SURVEY (2ND)  **Activating Strategies:**  Calculator methods  **Lesson:** TEST Chapter 2  **Resource/Materials:**  Textbook, calculator, powerpoint, notetaking guide | **Mini Lesson:**  Give back test  **Activating Strategies:**  A: CSI Stats: The Case of the Missing Cookies Correlation & Regression Applet  **LESSON:** 3.1 Scatterplots & Correlation  **Resource/Materials:**  Textbook, calculator, powerpoint, NTG | | **Mini Lesson: check HW**  **Activating Strategies:**  A: Investigating Properties of the Least Squares Regression Line  **LESSON:** 3.2 Least Squares Regression  **Resource/Materials:** Textbook, calculator, powerpoint, NTG | **Mini Lesson: check HW**  **Activating Strategies:**  Frappy Thursday  **LESSON:** Review Chapter 3  **Resource/Materials:**  Textbook, calculator, powerpoint, NTG | **Mini Lesson: check HW**  **Activating Strategies:**  **Review Calculator Methods**  **LESSON: TEST**  **Resource/Materials:**  Textbook, calculator, powerpoint, NTG |
| **Differentiation:**  *Content/Process/Product: Class curriculum*  *Grouping Strategy: pairs*  *Assessment- Homework, test, quizzes* | **Differentiation:**  *Content/Process/Product: Class curriculum*  *Grouping Strategy: Pairs*  *Assessment Homework, test, quizzes* | | **Differentiation:**  *Content/Process/Product: Class curriculum*  *Grouping Strategy: Pairs*  *Assessment Homework, test, quizzes* | **Differentiation:**  *Content/Process/Product: Class curriculum*  *Grouping Strategy : Pairs*  *Assessment Homework, test, quizzes* | **Differentiation:**  *Content/Process/Product: Class curriculum*  *Grouping Strategy: none*  *Assessment Homework, test, quizzes* |
| **Assessment:**  Formative: homework  Summative: Chapter 2 test | **Assessment:**  *Pre-Test:*  *Post-Test:*  *Formative: Homework*  *Summative: Chapter 3 test*  *Performance Based****:*** | | **Assessment:**  *Pre-Test:*  *Post-Test:*  *Formative: homework*  *Summative: chapter 3 test*  *Performance Based:* | **Assessment:**  *Pre-Test:*  *Post-Test:*  *Formative: homework*  *Summative: chapter 3 test*  *Performance Based:* | **Assessment:**  *Pre-Test:*  *Post-Test:*  *Formative:homework*  *Summative: chapter 3 test*  *Performance Based:* |
| **Homework:**  Read Chapter 3 | **Homework:**  HW: 1, 5, 7, 11, 13, 14- 18, 21, 26, 27-32 | | **Homework:**  HW: 27-32, 35, 37, 39, 41, 43, 45, 47, 49, 53, 54, 56, 58-61, 63, 65, 68, 69, 71-78 | **Homework:**  Review and practice test | **Homework:**  Read chapter 5 |

Resources and Reflective Notes:

**Chapter 3 Vocabulary**

**Coefficient of determination *r*2 -** The fraction of the variation in the values of *y* that is accounted for by the least-squares regression line of *y* on *x*. We can calculate *r*2  using the following formula: where SSE = Σ residual2 = Σ (*yi* –)2 and SST = Σ (*yi* –)2. 2SSE1SST*r*=− ˆ*yy*

**Correlation** Measures the direction and strength of the linear relationship between two quantitative variables. Correlation is usually written as *r*.

**Equation of the least-squares regression line** with slope and *y* intercept *.* ˆ*yabx*=+*sybrsx*= *aybx*=−

**Explanatory variable** A variable that may help explain or influences changes in a response variable.

**Extrapolation** The use of a regression line for prediction far outside the interval of values of the explanatory variable *x* used to obtain the line. Such predictions are often not accurate.

**Influential** An observation is influential for a statistical calculation if removing it would markedly change the result of the calculation. Points that are outliers in the *x* direction of a scatterplot are often influential for the least-squares regression line.

**Least-squares regression line** The least-squares regression line of *y* on *x* is the line that makes the sum of the squared vertical distances of the data points from the line as small as possible.

**Negative association** When above-average values of one variable tend to accompany below-average values of the other, and vice versa.

**Overall pattern** In any graph of data, look for the overall pattern and for striking departures from that pattern. You can describe the overall pattern of a scatterplot by the *direction, form, and strength* of the relationship.

**Outlier** An observation that lies outside the overall pattern of the other observations. Points that are outliers in the *y* direction but not the *x* direction of a scatterplot have large residuals. Other outliers may not have large residuals.

**Positive association** When above-average values of one variable tend to accompany above-average values of the other, and below-average values also tend to occur together.

**Predicted value** *(read “y hat”)* is the **predicted value** of the response variable y for a given value of the explanatory variable x. ˆ*y*

**Regression line** A line that describes how a response variable *y* changes as an explanatory variable *x* changes. We often use a regression line to predict the value of *y* for a given value of *x*.

**Residual** The difference between an observed value of the response variable and the value predicted by the regression line. That is,

residual = observed *y* – predicted *y* = . ˆ*yy*−

**Residual plot** A scatterplot of the regression residuals against the explanatory variable (or equivalently, against the predicted *y*-values). Residual plots help us assess how well a regression line fits the data.

**Response variable** A variable that measures an outcome of a study.

**Scatterplot** Shows the relationship between two quantitative variables measured on the same individuals. The values of one variable appear on the horizontal axis, and the values of the other variable appear on the vertical axis. Each individual in the data appears as a point in the graph.

**Slope** Suppose that *y* is a response variable (plotted on the vertical axis) and *x* is an explanatory variable (plotted on the horizontal axis). A regression line relating *y* to *x* has an equation of the form = *a* + *bx*. In this equation, *b* is the slope, the amount by which *y* is predicted to change when *x* increases by one unit. ˆ*y*

**Standard deviation of the residuals (*s*)** If we use a least-squares line to predict the values of a response variable *y* from an explanatory variable *x*, the standard deviation of the residuals (*s*) is given by ()22ˆresiduals22*iyysnn*−==−−ΣΣ

This value gives the approximate size of a “typical” or “average” prediction error (residual).

***y* intercept** Suppose that *y* is a response variable (plotted on the vertical axis) and *x* is an explanatory variable (plotted on the horizontal axis). A regression line relating *y* to *x* has an equation of the form = *a* + *bx*. In this equation, the number *a* is the *y* intercept, the predicted value of *y* when *x* = 0. ˆ*y*

HIGH SCHOOL STATISTICS STANDARDS

Summarize, represent, and interpret data on a single count or measurement variable

[CCSS.MATH.CONTENT.HSS.ID.A.1](http://www.corestandards.org/Math/Content/HSS/ID/A/1/)  
Represent data with plots on the real number line (dot plots, histograms, and box plots).

[CCSS.MATH.CONTENT.HSS.ID.A.2](http://www.corestandards.org/Math/Content/HSS/ID/A/2/)  
Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.

[CCSS.MATH.CONTENT.HSS.ID.A.3](http://www.corestandards.org/Math/Content/HSS/ID/A/3/)  
Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).

[CCSS.MATH.CONTENT.HSS.ID.A.4](http://www.corestandards.org/Math/Content/HSS/ID/A/4/)  
Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.

Summarize, represent, and interpret data on two categorical and quantitative variables

[CCSS.MATH.CONTENT.HSS.ID.B.5](http://www.corestandards.org/Math/Content/HSS/ID/B/5/)  
Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.

[CCSS.MATH.CONTENT.HSS.ID.B.6](http://www.corestandards.org/Math/Content/HSS/ID/B/6/)  
Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.

[CCSS.MATH.CONTENT.HSS.ID.B.6.A](http://www.corestandards.org/Math/Content/HSS/ID/B/6/a/)  
Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models.

[CCSS.MATH.CONTENT.HSS.ID.B.6.B](http://www.corestandards.org/Math/Content/HSS/ID/B/6/b/)  
Informally assess the fit of a function by plotting and analyzing residuals.

[CCSS.MATH.CONTENT.HSS.ID.B.6.C](http://www.corestandards.org/Math/Content/HSS/ID/B/6/c/)  
Fit a linear function for a scatter plot that suggests a linear association.

Interpret linear models

[CCSS.MATH.CONTENT.HSS.ID.C.7](http://www.corestandards.org/Math/Content/HSS/ID/C/7/)  
Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.

[CCSS.MATH.CONTENT.HSS.ID.C.8](http://www.corestandards.org/Math/Content/HSS/ID/C/8/)  
Compute (using technology) and interpret the correlation coefficient of a linear fit.

[CCSS.MATH.CONTENT.HSS.ID.C.9](http://www.corestandards.org/Math/Content/HSS/ID/C/9/)  
Distinguish between correlation and causation.