



**Plainfield Public Schools
Mathematics
Unit Planning Organizer**

| | |
|----------------------|----------------------------|
| Grade/Course | Algebra 1 |
| Unit of Study | Unit 4 : Statistics |
| Pacing | 7 weeks |

The Standards for Mathematical Practices

- MP1. Make sense of problems and persevere in solving them.
- MP2. Reason abstractly and quantitatively.
- MP3. Construct viable arguments and critique the reasoning of others.
- MP4. Model with mathematics.
- MP5. Use appropriate tools strategically.
- MP6. Attend to precision.
- MP7. Look for and make use of structure.
- MP8. Look for and express regularity in repeated reasoning.

Hyperlinks are noted underlined in italics.

NEW JERSEY STUDENT LEARNING STANDARDS

S.ID.A.1 Represent data with plots on the real number line (dot plots, histograms, and box plots).

S.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.

S.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).

S.ID.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.

S.ID.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.

S.ID.6 a. Fit a function to the data (including with the use of technology); use functions fitted to data to solve problems in the context of the data. Use given functions or chooses a function suggested by the context. Emphasize linear and exponential models.

S.ID.6b Informally assess the fit of a function by plotting and analyzing residuals, (including with the use of technology)

F.IF.B.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.*

F.IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. *For example, if the function $h(n)$ gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.*★

Hyperlinks are noted underlined in italics.

| “Unwrapped” Skills (students need to be able to do) | “Unwrapped” Concepts (students need to know) | DOK Levels |
|---|---|------------|
| FOCUS STANDARD: F.IF.B.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.* | | |
| Interpret | graph | 3 |

| “Unwrapped” Skills (students need to be able to do) | “Unwrapped” Concepts (students need to know) | DOK Levels |
|--|---|------------|
| FOCUS STANDARD: F.IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. <i>For example, if the function $h(n)$ gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.</i>★ | | |
| Relate | function | 3 |

| “Unwrapped” Skills (students need to be able to do) | “Unwrapped” Concepts (students need to know) | DOK Levels |
|---|---|------------|
| SUPPORTING STANDARD S.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. | | |
| Summarize | Categorical data | 3 |

Hyperlinks are noted underlined in italics.

| “Unwrapped” Skills (students need to be able to do) | “Unwrapped” Concepts (students need to know) | DOK Levels |
|---|---|------------|
| SUPPORTING STANDARD S.ID.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. | | |
| Represent | Quantitative variables | 1 |

| “Unwrapped” Skills (students need to be able to do) | “Unwrapped” Concepts (students need to know) | DOK Levels |
|---|---|------------|
| SUPPORTING STANDARD S.ID.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. a. Fit a function to the data (including with the use of technology); use functions fitted to data to solve problems in the context of the data. Use given functions or chooses a function suggested by the context. Emphasize linear and exponential models. | | |
| Use | Functions | 2 |

| “Unwrapped” Skills (students need to be able to do) | “Unwrapped” Concepts (students need to know) | DOK Levels |
|--|---|------------|
| SUPPORTING STANDARD S.ID.6b Informally assess the fit of a function by plotting and analyzing residuals, (including with the use of technology) | | |
| Assess | function | 2 |

Hyperlinks are noted underlined in italics.

| “Unwrapped” Skills (students need to be able to do) | “Unwrapped” Concepts (students need to know) | DOK Levels |
|--|---|------------|
| SUPPORTING STANDARD | | |
| S.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. | | |
| Use | Data distribution | 2 |

| “Unwrapped” Skills (students need to be able to do) | “Unwrapped” Concepts (students need to know) | DOK Levels |
|--|---|------------|
| SUPPORTING STANDARD | | |
| S.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). | | |
| Interpret | Data sets | 3 |

Hyperlinks are noted underlined in italics.

New Jersey Student Learning Standards and Mathematical PracticesExamples and Explanations

| Statistics and Probability: Interpreting Categorical and Quantitative Data★ (S-ID) Summarize, represent, and interpret data on a single count or measurement variable. | | |
|--|--|---|
| <u>Standards</u> | <u>Mathematical Practices</u> | <u>Explanations and Examples</u> |
| <p><i>Students are expected to:</i></p> <p>S-ID.A.1. Represent data with plots on the real number line (dot plots, histograms, and box plots).</p> | <p><i>HS.MP.4.</i> Model with mathematics.</p> <p><i>HS.MP.5.</i> Use appropriate tools strategically.</p> | |
| <p>S-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.</p> | <p><i>HS.MP.2.</i> Reason abstractly and quantitatively.</p> <p><i>HS.MP.3.</i> Construct viable arguments and critique the reasoning of others.</p> <p><i>HS.MP.4.</i> Model with mathematics.</p> <p><i>HS.MP.5.</i> Use appropriate tools strategically.</p> <p><i>HS.MP.7.</i> Look for and make use of structure.</p> | <p>Students may use spreadsheets, graphing calculators and statistical software for calculations, summaries, and comparisons of data sets.</p> <p>Examples:</p> <ul style="list-style-type: none"> • The two data sets below depict the housing prices sold in the King River area and Toby Ranch areas of Pinal County, Arizona. Based on the prices below which price range can be expected for a home purchased in Toby Ranch? In the King River area? In Pinal County? <ul style="list-style-type: none"> ○ King River area {1.2 million, 242000, 265500, 140000, 281000, 265000, 211000} ○ Toby Ranch homes {5 million, 154000, 250000, 250000, 200000, 160000, 190000} • Given a set of test scores {99, 96, 94, 93, 90, 88, 86, 77, 70, 68}, find the mean, median and standard deviation. Explain how the values vary about the mean and median. What information does this give the teacher? |

Hyperlinks are noted underlined in italics.

PPP Math Curriculum Algebra 1

| | | |
|--|--|--|
| <p>S-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).</p> | <p><i>HS.MP.2.</i> Reason abstractly and quantitatively.</p> <p><i>HS.MP.3.</i> Construct viable arguments and critique the reasoning of others.</p> <p><i>HS.MP.4.</i> Model with mathematics.</p> <p><i>HS.MP.5.</i> Use appropriate tools strategically.</p> <p><i>HS.MP.7.</i> Look for and make use of structure.</p> | <p>Students may use spreadsheets, graphing calculators and statistical software to statistically identify outliers and analyze data sets with and without outliers as appropriate.</p> |
|--|--|--|

Hyperlinks are noted underlined in italics.

PPP Math Curriculum Algebra 1

| <p>S-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.</p> | <p><i>HS.MP.1.</i> Make sense of problems and persevere in solving them.</p> <p><i>HS.MP.2.</i> Reason abstractly and quantitatively.</p> <p><i>HS.MP.3.</i> Construct viable arguments and critique the reasoning of others.</p> <p><i>HS.MP.4.</i> Model with mathematics.</p> <p><i>HS.MP.5.</i> Use appropriate tools strategically.</p> <p><i>HS.MP.6.</i> Attend to precision.</p> <p><i>HS.MP.7.</i> Look for and make use of structure.</p> <p><i>HS.MP.8.</i> Look for and express regularity in repeated reasoning.</p> | <p>Students may use spreadsheets, graphing calculators, statistical software and tables to analyze the fit between a data set and normal distributions and estimate areas under the curve.</p> <p>Examples:</p> <ul style="list-style-type: none"> The bar graph below gives the birth weight of a population of 100 chimpanzees. The line shows how the weights are normally distributed about the mean, 3250 grams. Estimate the percent of baby chimps weighing 3000-3999 grams. <div style="text-align: center;"> <p>Birth Weight Distribution for a Population</p> <table border="1" style="margin: 10px auto;"> <caption>Data from Birth Weight Distribution Histogram</caption> <thead> <tr> <th>Weight (grams)</th> <th>Percent of Births</th> </tr> </thead> <tbody> <tr><td><1499</td><td>0</td></tr> <tr><td>1500-1999</td><td>2</td></tr> <tr><td>2000-2499</td><td>5</td></tr> <tr><td>2500-2999</td><td>22</td></tr> <tr><td>3000-3499</td><td>42</td></tr> <tr><td>3500-3999</td><td>22</td></tr> <tr><td>4000-4499</td><td>5</td></tr> <tr><td>4500-4999</td><td>2</td></tr> <tr><td>>5000</td><td>0</td></tr> </tbody> </table> </div> <ul style="list-style-type: none"> Determine which situation(s) is best modeled by a normal distribution. Explain your reasoning. <ul style="list-style-type: none"> Annual income of a household in the U.S. Weight of babies born in one year in the U.S. | Weight (grams) | Percent of Births | <1499 | 0 | 1500-1999 | 2 | 2000-2499 | 5 | 2500-2999 | 22 | 3000-3499 | 42 | 3500-3999 | 22 | 4000-4499 | 5 | 4500-4999 | 2 | >5000 | 0 |
|--|---|--|----------------|-------------------|-------|---|-----------|---|-----------|---|-----------|----|-----------|----|-----------|----|-----------|---|-----------|---|-------|---|
| Weight (grams) | Percent of Births | | | | | | | | | | | | | | | | | | | | | |
| <1499 | 0 | | | | | | | | | | | | | | | | | | | | | |
| 1500-1999 | 2 | | | | | | | | | | | | | | | | | | | | | |
| 2000-2499 | 5 | | | | | | | | | | | | | | | | | | | | | |
| 2500-2999 | 22 | | | | | | | | | | | | | | | | | | | | | |
| 3000-3499 | 42 | | | | | | | | | | | | | | | | | | | | | |
| 3500-3999 | 22 | | | | | | | | | | | | | | | | | | | | | |
| 4000-4499 | 5 | | | | | | | | | | | | | | | | | | | | | |
| 4500-4999 | 2 | | | | | | | | | | | | | | | | | | | | | |
| >5000 | 0 | | | | | | | | | | | | | | | | | | | | | |

Hyperlinks are noted underlined in italics.

| Statistics and Probability: Interpreting Categorical and Quantitative Data ★ (S-ID) Summarize, represent, and interpret data on two categorical and quantitative variables. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--|---|-------|-------------------------|--|--|--|------|-----|--|-------|--|-----------------|-------------|--|----|----|----|----|-----|----|----|----|-------|----|----|-----|----------------------------------|--|--|--|------|-----|--|-------|--|-----------------|-------------|--|----|------|------|------|-----|------|------|------|-------|------|------|------|
| <u>Standards</u> <i>Students are expected to:</i> | <u>Mathematical Practices</u> | <u>Explanations and Examples</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>S-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.</p> | <p><i>HS.MP.1.</i> Make sense of problems and persevere in solving them.</p> <p><i>HS.MP.2.</i> Reason abstractly and quantitatively.</p> <p><i>HS.MP.3.</i> Construct viable arguments and critique the reasoning of others.</p> <p><i>HS.MP.4.</i> Model with mathematics.</p> <p><i>HS.MP.5.</i> Use appropriate tools strategically.</p> <p><i>HS.MP.8.</i> Look for and express regularity in repeated reasoning.</p> | <p>Students may use spreadsheets, graphing calculators, and statistical software to create frequency tables and determine associations or trends in the data.</p> <p>Examples:</p> <ul style="list-style-type: none"> <p>Two-way Frequency Table</p> <p>A two-way frequency table is shown below displaying the relationship between age and baldness. We took a sample of 100 male subjects, and determined who is or is not bald. We also recorded the age of the male subjects by categories.</p> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th colspan="4">Two-way Frequency Table</th> </tr> <tr> <th>Bald</th> <th colspan="2">Age</th> <th>Total</th> </tr> <tr> <td></td> <th>Younger than 45</th> <th>45 or older</th> <td></td> </tr> </thead> <tbody> <tr> <td>No</td> <td>35</td> <td>11</td> <td>46</td> </tr> <tr> <td>Yes</td> <td>24</td> <td>30</td> <td>54</td> </tr> <tr> <td>Total</td> <td>59</td> <td>41</td> <td>100</td> </tr> </tbody> </table> <p>The <i>total</i> row and <i>total</i> column entries in the table above report the marginal frequencies, while entries in the body of the table are the joint frequencies.</p> <p>Two-way Relative Frequency Table</p> <p>The relative frequencies in the body of the table are called conditional relative frequencies.</p> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th colspan="4">Two-way Relative Frequency Table</th> </tr> <tr> <th>Bald</th> <th colspan="2">Age</th> <th>Total</th> </tr> <tr> <td></td> <th>Younger than 45</th> <th>45 or older</th> <td></td> </tr> </thead> <tbody> <tr> <td>No</td> <td>0.35</td> <td>0.11</td> <td>0.46</td> </tr> <tr> <td>Yes</td> <td>0.24</td> <td>0.30</td> <td>0.54</td> </tr> <tr> <td>Total</td> <td>0.59</td> <td>0.41</td> <td>1.00</td> </tr> </tbody> </table> | | Two-way Frequency Table | | | | Bald | Age | | Total | | Younger than 45 | 45 or older | | No | 35 | 11 | 46 | Yes | 24 | 30 | 54 | Total | 59 | 41 | 100 | Two-way Relative Frequency Table | | | | Bald | Age | | Total | | Younger than 45 | 45 or older | | No | 0.35 | 0.11 | 0.46 | Yes | 0.24 | 0.30 | 0.54 | Total | 0.59 | 0.41 | 1.00 |
| Two-way Frequency Table | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bald | Age | | Total | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Younger than 45 | 45 or older | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| No | 35 | 11 | 46 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Yes | 24 | 30 | 54 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total | 59 | 41 | 100 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Two-way Relative Frequency Table | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bald | Age | | Total | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Younger than 45 | 45 or older | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| No | 0.35 | 0.11 | 0.46 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Yes | 0.24 | 0.30 | 0.54 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total | 0.59 | 0.41 | 1.00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Hyperlinks are noted underlined in italics.

PPP Math Curriculum Algebra 1

| | | |
|---|--|--|
| <p>S-ID.B.6. Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.</p> <p>a. Fit a function to the data; (including with the use of technology) use functions fitted to data to solve problems in the context of the data. <i>Use given functions or chooses a function suggested by the context. Emphasize linear, quadratic, and exponential models.</i></p> <p>b. Informally assess the fit of a function by plotting and analyzing residuals, (including with the use of technology)</p> | <p><i>HS.MP.2.</i> Reason abstractly and quantitatively.</p> <p><i>HS.MP.3.</i> Construct viable arguments and critique the reasoning of others.</p> <p><i>HS.MP.4.</i> Model with mathematics.</p> <p><i>HS.MP.5.</i> Use appropriate tools strategically.</p> <p><i>HS.MP.7.</i> Look for and make use of structure.</p> <p><i>HS.MP.8.</i> Look for and express regularity in repeated reasoning.</p> | <p>The residual in a regression model is the difference between the observed and the predicted y for some x (y the dependent variable and x the independent variable).</p> <p>So if we have a model $y = ax + b$ and a data point (x_i, y_i), the residual is for this point is $r_i = y_i - (ax_i + b)$. Students may use spreadsheets, graphing calculators, and statistical software to represent data, describe how the variables are related, fit functions to data, perform regressions, and calculate residuals.</p> <p>Example:</p> <ul style="list-style-type: none"> • Measure the wrist and neck size of each person in your class and make a scatterplot. Find the least squares regression line. Calculate and interpret the correlation coefficient for this linear regression model. Graph the residuals and evaluate the fit of the linear equations. |
|---|--|--|

Hyperlinks are noted underlined in italics.

| Functions: Interpreting Functions (F-IF) Interpret functions that arise in applications in terms of context. | | |
|---|---|--|
| <p>F-IF.B.4. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. <i>Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.</i></p> | <p><i>HS.MP.2.</i> Reason abstractly and quantitatively.</p> <p><i>HS.MP.4.</i> Model with mathematics.</p> <p><i>HS.MP.5.</i> Use appropriate tools strategically.</p> <p><i>HS.MP.6.</i> Attend to precision.</p> | <p>Students may be given graphs to interpret or produce graphs given an expression or table for the function, by hand or using technology.</p> <p>Examples:</p> <ul style="list-style-type: none"> ● A rocket is launched from 180 feet above the ground at time $t = 0$. The function that models this situation is given by $h = -16t^2 + 96t + 180$, where t is measured in seconds and h is height above the ground measured in feet. <ul style="list-style-type: none"> ○ What is a reasonable domain restriction for t in this context? ○ Determine the height of the rocket two seconds after it was launched. ○ Determine the maximum height obtained by the rocket. ○ Determine the time when the rocket is 100 feet above the ground. ○ Determine the time at which the rocket hits the ground. ○ How would you refine your answer to the first question based on your response to the second and fifth questions? <ul style="list-style-type: none"> ● Compare the graphs of $y = 3x^2$ and $y = 3x^3$. <ul style="list-style-type: none"> ● Let $R(x) = \frac{2}{\sqrt{x-2}}$. Find the domain of $R(x)$. Also find the range, zeros, and asymptotes of $R(x)$. ● Let $f(x) = 5x^3 - x^2 - 5x + 1$. Graph the function and identify end behavior and any intervals of constancy, increase, and decrease. ● It started raining lightly at 5am, then the rainfall became heavier at 7am. By 10am the storm was over, with a total rainfall of 3 inches. It didn't rain for the rest of the day. Sketch a possible graph for the number of inches of rain as a function of time, from midnight to midday. |
| <p>F-IF.B.5. Relate the domain of a function to its graph and, where applicable, to the quantitative</p> | <p><i>HS.MP.2.</i> Reason abstractly and quantitatively.</p> | <p>Students may explain orally, or in written format, the existing relationships.</p> |

Hyperlinks are noted underlined in italics.

PPP Math Curriculum Algebra 1

| | | |
|--|--|--|
| <p>relationship it describes. <i>For example, if the function $h(n)$ gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.</i></p> | <p><i>HS.MP.4.</i> Model with mathematics.</p> <p><i>HS.MP.6.</i> Attend to precision.</p> | |
|--|--|--|

Hyperlinks are noted underlined in italics.

II. Essential QuestionsCorresponding Big Ideas

| Essential Questions | Corresponding Big Ideas |
|---|---|
| <p>How does data make and inform decisions?</p> <p>What does statistics tell you about data?</p> <p>What impact does an outlier have on data? Which measure is most affect by outliers?</p> <p>How does a model fit data?</p> <p>How can we organize to compare and contrast traits?</p> <p>How can we determine if relationships of two variables is a linear model?</p> | <p>Mathematical models describe structure</p> <p>Statistical models extend mathematical model by describing variability around the structure. The shape of a distribution influences which summary measure is more appropriate for describing the center of a distribution for quantitative data.</p> <p>Statistical models are evaluated by how well they describe data and whether they are useful.</p> <p>Graph and tables based on a division of the ordered data into equal sized group are useful for displaying distributions of quantitative data.</p> <p>Some numerical summaries of quantitative data are more resistant that others to extreme data values, called outliers.</p> <p>The focus of comparisons between two or group of data is on similarities and differences between the distributions.</p> <p>The amount of separation between two or more distributions is related to the amount of variability within them.</p> <p>Graphs and tables are useful for displaying bivariate distributions of data on two categorical.</p> <p>Conditional relative frequency distributions are useful for establishing an association between two categorical variables.</p> <p>When the trend in bivariate data on the two quantitative variables is generally</p> |

Hyperlinks are noted underlined in italics.

| | |
|--|--|
| | <p>linear, a centrally located line can be useful for making predictions.</p> <p>Source:</p> <p><i>Gould, R. & Miller, S. (2013). Developing Essential Understanding of Statistics, Grades 9-12. Reston, VA: The National Council of Teachers of Mathematics, Inc.</i></p> <p><i>Jacobbe, T. & Wilson, P. (2013). Developing Essential Understanding of Statistics, Grades 6-8. Reston, VA: The National Council of Teachers of Mathematics, Inc.</i></p> |
|--|--|

IV. Student Learning ObjectivesInstructional Clarification

| Student Learning Objectives | Concept /Skills | <u>Instructional Clarification for PARCC for Math Test Specification</u> | Mathematical Practices |
|--|--|--|--|
| Represent data with plots (dot plots, histograms, and box plots) on the real number line. S.ID.A.1 | Concept(s): No new concept(s) introduced Students are able to: <ul style="list-style-type: none"> • Represent data with dot plots on the real number line. • Represent data with histograms on the real number line. • Represent data with box plots on the real number line. | | MP.1 MP.2 MP.4 MP.5 MP.6. |
| Compare center and spread of two or more data sets, interpreting differences in shape, center, and spread in the context of the data, taking into account the effects of outliers. S.ID.A.2., S.ID.A.3 | Concept(s): <ul style="list-style-type: none"> • Appropriate use of a statistic depends on the shape of the data distribution. • Standard deviation Students are able to: <ul style="list-style-type: none"> • Represent two or more data sets with plots and use appropriate statistics to compare their center and spread. • Interpret differences in shape, center, and spread in context. • Explain possible effects of extreme data points (outliers) when summarizing data and interpreting shape, center and spread. | <ul style="list-style-type: none"> • For tasks that use bivariate data, limit the use of time series. Instead use data that may have variation in the y-values for given x-values, such as pre and post test scores, height and weight, etc. • Predictions should not extrapolate far beyond the set of data provided. | <ul style="list-style-type: none"> • MP.1 • MP.2 • MP.4 • MP.5 • MP.6 |
| Summarize and interpret categorical data for two categories in two-way | Concept(s): <ul style="list-style-type: none"> • Categorical variables represent types of data which may be divided | <ul style="list-style-type: none"> • Tasks must have at least one of the categorical variables with more than two sub- | MP.1. MP.5 MP.7 |

Hyperlinks are noted underlined in italics.

PPP Math Curriculum Algebra 1

| | | | |
|--|--|---|---|
| <p>frequency tables; explain possible associations and trends in the data. S.ID.B.5</p> | <p>into groups. Students are able to:</p> <ul style="list-style-type: none"> • Construct two-way frequency tables for categorical data. • Interpret joint, marginal and conditional relative frequencies in context. • Explain possible associations between categorical data in two-way tables. • Identify and describe trends in the data. | <p>categories</p> <ul style="list-style-type: none"> • "Total" rows and columns will be provided but may be missing the data. • Associations should be investigated based on relative frequencies, not counts. | |
| <p>Fit functions to data using technology, plot residuals and informally assess the fit of linear and non-linear functions by analyzing residuals. S.ID.B.6., S.ID.B.6.a, S.ID.B.6.b</p> | <p>Concept(s): No new concept(s) introduced Students are able to:</p> <ul style="list-style-type: none"> • Fit a function to data using technology. • Solve problems using functions fitted to data (prediction equations). • Interpret the intercepts of models in context. • Plot residuals of linear and non-linear functions. • Analyze residuals in order to informally evaluate the fit of linear and non-linear functions. | <ul style="list-style-type: none"> • Line of best fit is always based on the equation of the least squares regression line either provided or calculated through the use of technology. <ul style="list-style-type: none"> • To investigate associations, students may be asked to evaluate scatter plots that may be provided or created using technology. Evaluation includes shape, direction, strength, presence of outliers, and gaps. <ul style="list-style-type: none"> • Exponential models may assess rate of growth, intercepts, etc • Analysis of residuals may include the identification of a pattern in a residual plot as an indication of a poor fit. | <p>MP.1 MP.2. MP.4 MP.5 MP.6.</p> |

Hyperlinks are noted underlined in italics.

PPP Math Curriculum Algebra 1

| | | | |
|--|--|---|---------------------------------|
| <p>Interpret key features of functions from graphs and tables. Given a verbal description of the relationship, sketch the graph of a function, showing key features and relating the domain of the function to its graph. F.IF.B.4, F.IF.B.5</p> | <p>Concept(s): No new concept(s) introduced Students are able to:</p> <ul style="list-style-type: none"> • Interpret maximum/minimum and intercepts of functions from graphs and tables in the context of the problem. • Sketch graphs of functions given a verbal description of the relationship between the quantities. • Identify intercepts and intervals where function is increasing/decreasing. • Determine the practical domain of a function. | <p>Tasks have a real-world context.</p> | <p>MP.2 MP.4 MP.6</p> |
|--|--|---|---------------------------------|

Hyperlinks are noted underlined in italics.

V. Unit Vocabulary

| Unit Vocabulary | |
|------------------------|-------------------------|
| quantitative variables | Rate of change |
| outliers | Correlation coefficient |
| linear association | Dot plot |
| residuals | Histogram |
| categorical data | Box plot |
| relative frequencies | Box and Whisker plot |
| linear functions | Interquartile range |
| exponential functions | Margin of effort |
| correlation | Frequency table |
| causation | Scatter plot |
| linear fit | |
| linear model | |

Hyperlinks are noted underlined in italics.

VI. Differentiation/ Modifications Teaching Strategies

| Research Based Effective Teaching Strategies | Modifications (how do I differentiate instruction?) | Special Education | Strategies for English Language Learners |
|--|---|--|--|
| <p>Task /Activities that solidifies mathematical concepts Use questioning techniques to facilitate learning</p> <p>Reinforcing Effort, Providing Recognition</p> <p>Practice, reinforce and connect to other ideas within mathematics</p> <p>Promotes linguistic and nonlinguistic representations</p> <p>Cooperative Learning Setting Objectives, Providing Feedback</p> <p>Varied opportunities for students to communicate mathematically</p> <p>Use technological and /or physical tools</p> | <p>Modifications</p> <p>Before or after school tutorial program Leveled rubrics Increased intervention Small groups Change in pace Calculators Extended time Alternative assessments Tiered activities/products Color coded notes Use of movements Use any form of technology</p> <p>Use self-sticking notes</p> <p>Extension</p> <p><i>Students summaries how mean absolute deviation is use to predict errors and judge quality. Students must provide support details to defend mathematical summary .</i></p> | <p>Change in pace Calculators Alternative assessments Accommodations as per IEP Modifications as per IEP Use graphic organizer to clarify mathematical functions for students with processing and organizing difficulties'.</p> <p>Constant review of math concepts to strengthen understanding of prior concepts for difficulties recalling facts.</p> <p>Use self-regulations strategies for student to monitor and assess their thinking and performance for difficulty attending to task</p> <p>Cooperative learning (small group, teaming, peer assisted tutoring) to foster communication and strengthen confidence.</p> | <p><u><i>Whiteboards</i></u> <u><i>Small Group / Triads</i></u> <u><i>Word Walls</i></u> <u><i>Partially Completed Solution</i></u> <u><i>Gestures</i></u> <u><i>Native Language Supports</i></u> <u><i>Pictures / Photos</i></u> <u><i>Partner Work</i></u> <u><i>Work Banks</i></u> <u><i>Teacher Modeling</i></u> <u><i>Math Journals</i></u></p> <p><i>A groups perform transformation of data sets. Students create a data set then determine which an operation that should be perform to each value. They exchange data sets, then solve for mean median , mode ,rang and standard deviation of the original data set and of the new data after the operation is performed.</i></p> |

Hyperlinks are noted underlined in italics.

PPP Math Curriculum Algebra 1

| | | | |
|---|--|---|--|
| <p>21st Century Learning Skills :</p> | | <p>Use technology and/or hands on devices to: clarify abstract concepts and process for:</p> <ol style="list-style-type: none"> 1. Difficulty interpreting pictures and diagram. 2. difficulties with oral communications 3. Difficulty correctly identifying symbols of numeral 4. Difficulty maintaining attentions <p>Simplify and reduces strategies / Goal structure to enhance motivation, foster independence and self-direction for:</p> <ol style="list-style-type: none"> 1. difficulty attending to task 2. difficulty with following a sequence of steps to solution. 3. difficulty processing and organizing <p>Scaffolding math idea/concepts guided practice and questioning strategies' to clarify and</p> | |
| <p>Teamwork and Collaboration</p> | | | |
| <p>Initiative and Leadership</p> | | | |
| <p>Curiosity and Imagination</p> | | | |
| <p>Innovation and Creativity</p> | | | |
| <p>Critical thinking and Problem Solving</p> | | | |
| <p>Flexibility and Adaptability</p> | | | |
| <p>Effective Oral and Written Communication</p> | | | |
| <p>Accessing and Analyzing Information</p> | | | |

Hyperlinks are noted underlined in italics.

PPP Math Curriculum Algebra 1

| | | | |
|--|--|--|--|
| | | <p>enhance understanding of math big ideas for:</p> <ol style="list-style-type: none">1. Difficulty with process and organization2. difficulty with oral and written communication <p>Teacher models strategies' and think out aloud strategies to specify step by step process for</p> <ol style="list-style-type: none">1. Difficulties processing and organization2. Difficulty attending to tasks. <p>Use bold numbers and/or words to draw students' attention to important information.</p> <p><i>***Provide data values that are easy to manipulate so that students can concentrate on organizing, manipulate data into group and learning vocabulary.</i></p> | |
|--|--|--|--|

Hyperlinks are noted underlined in italics.

VII. Instructional Resources Materials

| Instructional Resources and Materials | | |
|--|--|---|
| Formative Assessment | Print | |
| Short constructed responses Extended responses Checks for Understanding Exit tickets Teacher observation Projects Group Timed Practice Test – Multiple Choice & Open-Ended Questions Performance Task <u><i>S.ID.B.5 ILLUSTRATIVE MATHEMATICS PERFORMANCE TASK " Support for a Longer School Day?"</i></u> <u><i>S.ID.B.6 ILLUSTRATIVE MATHEMATICS PERFORMANCE TASK " Laptop Battery Charge 2"</i></u> Additional Performance Tasks <u><i>S.ID.A.1-3 Haircut Costs</i></u> <u><i>S.ID.A.1-3 Speed Trap</i></u> <u><i>S.ID.A.2-3 Measuring Variability in a Data Set</i></u> <u><i>S.ID.A.3 Identifying Outliers</i></u> | Pearson Algebra 1 with Foundation 2011(Middle school): <ul style="list-style-type: none"> Chapter 12: Data Analysis and Probability Holt McDougal Larson: Algebra 1 (2011) (High School): Chapter 13 : Probability and Data Analysis | |
| | Resources for teachers <u><i>Annenberg Learning : Insight into Algebra 1</i></u> <u><i>Mathematics Assessment Projects</i></u> <u><i>Get the Math</i></u> <u><i>Achieve the Core</i></u> <u><i>Webmath.com</i></u> <u><i>sosmath.com</i></u> <u><i>Mathplanet.com</i></u> <u><i>Interactive Mathematics.com</i></u> <u><i>Illustrative Mathematics</i></u> <u><i>Inside Mathmatics.org</i></u> <u><i>Asia Pacific Economic Cooperation : :Lesson Study</i></u> <u><i>Videos</i></u> <u><i>Genderchip.org</i></u> <u><i>Interactive Geometry</i></u> <u><i>Mathematical Association of America</i></u> <u><i>National Council of Teachers of Mathematics</i></u> <u><i>learner.org</i></u> <u><i>Math Forum : Teacher Place</i></u> <u><i>Shmoop /common core math</i></u> | Resources for Students <u><i>Khan Academy</i></u> <u><i>Math world : Wolfram.com</i></u> <u><i>Webmath.com</i></u> <u><i>sosmath.com</i></u> <u><i>Mathplanet.com</i></u> <u><i>Interactive Mathematics.com</i></u> <u><i>Mathexpression.com.algebra</i></u> <u><i>Math Words for Advance Algebra & Pre-Calculus</i></u> <u><i>Math TV</i></u> <u><i>Virtual Nerd : Algebra 1</i></u> |

Hyperlinks are noted underlined in italics.

| | | |
|---|--|--|
| <p><u><i>F.IF.B.4 The Aquarium</i></u> <u><i>F.IF.B.4 Containers</i></u> Project (optional)</p> <p><u><i>TEACH 21 Problem Based Learning Project "Open for Business"</i></u></p> | | |
|---|--|--|