Marietta City Schools

2023–2024 District Unit Planner

Enhanced Algebra: Concepts & Connections (Grade 8)

Unit title	*Unit 6: Investigating Data and Statistical Reasoning*	**MYP year**	*3*	**Unit duration (hrs)**	*Enter Hours* *MSGA- (5 hours per week)* *MMS- (4.5 hours per week)* *MHS- (7.5 hours per 2 weeks)*

Mastering Content and Skills through INQUIRY (Establishing the purpose of the Unit): ***What will students learn?***

GA DoE Standards

Standards

8.FGR.6: Solve practical, linear problems involving situations using bivariate quantitative data.

8.FGR.6.1 Show that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, visually fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line of best fit.

8.FGR.6.2 Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercepts.

8.FGR.6.3 Explain the meaning of the predicted slope (rate of change) and the predicted intercept (constant term) of a linear model in the context of the data. A.DSR.10.4 Interpret the slope (predicted rate of change) and the intercept (constant term) of a linear model in the framework of the data.

8.FGR.6.4 Use appropriate graphical displays from data distributions involving lines of best fit to draw informal inferences and answer the statistical investigative question posed in an unbiased statistical study.

A.DSR.10: Collect, analyze, and interpret univariate quantitative data to answer statistical investigative questions that compare groups to solve real-life problems; Represent bivariate data on a scatter plot and fit a function to the data to answer statistical questions and solve real-life problems.

A.DSR.10.1 Use statistics appropriate to the shape of the data distribution to compare center (median and mean) and variability (interquartile range, standard deviation) of two or more distributions by hand and using technology.

A.DSR.10.2 Interpret differences in shape, center, and variability of the distributions in the framework (context), accounting for possible effects of extreme data points (outliers).

A.DSR.10.3 Represent data on two quantitative variables on a scatter plot and describe how the variables are related.

A.DSR.10.5 Calculate the line of best fit and interpret the correlation coefficient, r, of a linear fit using technology. Use r to describe the strength of the goodness of fit of the regression. Use the linear function to make predictions and assess how reasonable the prediction is in context.

A.DSR.10.6 Decide which type of function is most appropriate by observing graphed data.

A.DSR.10.7 Distinguish between correlation and causation

A.MM.1: Apply mathematics to real-life situations; model real-life phenomena using mathematics

A.MM.1.1 Explain applicable, mathematical problems using a mathematical model.
A.MM.1.2 Create mathematical models to explain phenomena that exist in the natural sciences, social sciences, liberal arts, fine and performing arts, and/or humanities domains.
A.MM.1.4 Use various mathematical representations and structures with this information to represent and solve real-life problems.
A.MM.1.5 Define appropriate quantities for the purpose of descriptive modeling.

A.MP.1-8 : Display perseverance and patience in problem-solving. Demonstrate skills and strategies needed to succeed in mathematics, including critical thinking, reasoning, and effective collaboration and expression. Seek help and apply feedback. Set and monitor goals.

Concepts/Skills to support mastery of standards

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MCS Gifted Standards

MSC.Gifted.S2B.
MSC.Gifted.S3B.
MSC.Gifted.S4B.

Vocabulary

[K-12 Mathematics Glossary]

association	**bivariate data**	**box plot**	**categorical values**	**causation**	**center**	**conditional frequencies**
constant	**correlation**	**correlation coefficient**	**data distribution**	**dot plot**	**First Quartile (Q1)**	**five-number summary**
frequency table (two-way table)	**histogram**	**intercept**	**deviation**	**interquartile range**	**joint frequencies**	**line of best fit**
linear model	**linear fit**	**marginal frequencies**	**Mean Absolute Deviation (MAD)**	**prediction**	**outlier**	**quantitative data**
quantitative variables	**range**	**rate of change**	**regression**	**scatter plot**	**Second Quartile (Q2)**	**shape of data distribution**
Shape Symmetry, Number of Peaks, Direction of Skew, Uniformity	**slope**	**standard deviation**	**third quartile**	**trend**	**univariate data**	**variability**
deterministic interpretation	**informal inferences**	**predicted intercept (constant term)**	**predicted slope (rate of change)**	**probabilistic interpretation**	**statistical investigative question**	**unbiased statistical study**
x - intercept	**y - intercept**					

Notation

$\bar{x}$ - mean, σ - standard deviationMId

Key concept	Related concept(s)	Global context
Relationships	Change, Space, Quantity	Scientific and Technical Innovation
Statement of inquiry		
Exploring multiple representations of quantifiable data using models enhances understanding of relationships		

Inquiry questions
Factual— How is data measured? How can we represent information? ● What is a dot plot? ● What is a histogram? ● What is a box plot? ● How do I graph a line of best fit? **Conceptual—** What makes a good survey question? How do we interpret/analyze results? ● How does the correlation coefficient affect a graph? ● What classifies a strong/weak correlation coefficient? **Debatable-** Who makes decisions? How do we ensure our decisions are based in logic? ● What graph is easiest to read: a histogram, dot plot or a box plot?

MYP Objectives	Assessment Tasks	
*What specific MYP **objectives** will be addressed during this unit?*	***Relationship** between summative assessment task(s) and statement of inquiry:*	*List of common formative and summative assessments.*
Criteria C: Communication in Mathematics Criterion D: Applying Mathematics In real life contexts.	Students will demonstrate how modeling relationships can help us make logical decisions.	**Formative Assessment(s):** **Unit 6** - CFA **Summative Assessment(s):** **Unit 6** - Summative Assessment **Unit 6** - Summative Assessment Retake **MYP Project**: A Penny a Day
Approaches to learning (ATL)		

Category: Communication Skills
Cluster: Communication
Skill Indicator: Negotiate ideas and knowledge with peers and teachers

Learning Experiences Add additional rows below as needed.		
Objective or Content	**Learning Experiences**	**Personalized Learning and Differentiation**
8.FGR.6.1- Construct a Scatter Plot	Scatter Plots (Desmos) Brief Description: In this activity, students will explore various types of scatter plots and will build their understanding of positive and negative associations, linear and nonlinear associations, and outliers. (8.SP.1) This activity serves as a great precursor to an investigation of lines of best fit. Learning Goals: ● I can explore various types of Scatter plots and their associations ● I can describe the type of association in a Scatter plot	Students will explore various types of scatter plots and build their understanding of positive and negative association, linear and nonlinear associations and outliers. Precursor to Line of Best Fit
8.FGR.6.4- Use the Line of Best Fit to draw inferences	Line of Best Fit (Illuminations) Brief Description: This activity allows the user to enter a set of data, plot the data on a coordinate grid, and determine the equation for a line of best fit. Learning Goals: ● I can state the correlation coefficient (*r*) for a set of data. ● I can explain why changing the regression equation affects *r* value. ● I can explain what has the greatest impact on the regression equation and *r* value. ● Can you explain the changes that occurred when data is removed?	This activity allows the user to enter a set of data, plot the data on a coordinate grid, and determine the equation for a line of best fit.

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A.DSR.10: Collect, analyze, and interpret univariate quantitative data to answer statistical investigative questions that compare groups to solve real-life problems; Represent bivariate data on a scatter plot and fit a function to the data to answer statistical questions and solve real-life problems. o A.DSR.10.3: Represent data on two quantitative variables on a scatter plot and describe how the variables are related. o A.DSR.10.5: Calculate the line of best fit and interpret the correlation coefficient, r, of a linear fit using technology. Use r to describe the strength of the goodness of fit of the regression. Use the linear function to make predictions and assess how reasonable the prediction is in context.	**<u>Sports Analysis- Explore and Engage</u>** **Description:** In this learning plan, students will collect, analyze and interpret the strength of a correlation, describe how two variables are related, and fit a linear function for a scatter plot that suggests a linear association **Learning Goals:** ● I can fit a linear function for a scatter plot that suggests a linear association. ● I can describe how two variables are related. ● I can describe the strength of a correlation.	Language Supports: Provide a hard copy of a graphic organizer that illustrates several different models: positive/strong correlation, positive/weak correlation, negative strong correlation, negative weak correlation, no correlation, and perfect correlation. All students to work in small groups to complete the graphic organizer. Ask probing, scaffolding questions to support students as they work to complete the graphic organizer. Supporting the Learning: Guide students through the discovery process to recognize how the scatter box changes when the correlation coefficient is closer to 1, closer to 0, closer to -1? Extending the Learning: Name different pairs of variables that are likely to have a positive correlation, a negative correlation, a perfect correlation, and no correlation.

GADOE Link

SAVVAS Correlated Lessons 8th Grade Volume 1

8.FGR.6

- Lesson 4-1 (Construct and Interpret Scatterplots)
- Lesson 4-2 (Analyze Linear Relationships)
- Lesson 4-3 (Use Linear Models to Make Predictions)

SAVVAS Correlated Lessons Algebra 1 Envision

A.DSR.10

A.DSR.10.1 - Lesson 11-2, 11-3, 11-4, Topic 11 - Mathematical Modeling in 3 Acts
A.DSR.10.2 - Lessons 11-2, 11-3, Topic 11 - Mathematical Modeling in 3 Acts
A.DSR.10.3 - Lesson 3-5, 3-6, Topic 3 - Mathematical Modeling in 3 Acts
A.DSR.10.4 - Lessons 3-5, Topic 3 - Mathematical Modeling in 3 Acts
A.DSR.10.5 - Lessons 3-6
A.DSR.10.6 - Lesson 8-5
A.DSR.10.7 - Lesson 3-6

YouTube
ATL Skills - TEDEd
A.DRS.10 - Erin's Essential Questions Playlist: Intro to Statistics

Ed Puzzle

Khan Academy