Statistical Algebra Overview

Course Description: This course focuses on the connections between mathematics and its applications to the real world. It starts with an introduction to statistics. The initial focus is univariate data and how to describe a collection of numbers in context. As we shift to bivariate data, we focus on functions through regression and the lens of real world applications. The ultimate goal is for students to attach real world concepts they are familiar with to algebraic ideas.

Grade Level: 10-12

Curricular Work Thus Far:

1. Responded to Strategic Plan Objective 1.1.4, which calls for us to engage 6th-10th grade math teachers and principals in the development of an inclusive, student-centered sequence of math coursework that ensures equitable access to key grade level standards and alignment across schools.

2. Solicited feedback from district and community stakeholders to guide course development.

3. Examined state standards (Missouri Learning Standards) and national standards (Common Core State Standards) to inform course development.

4. Drafted a curricular scope & sequence of nine units within the yearlong course.

    Unit 1: Descriptive Statistics
    Unit 2: Basic Probability
    Unit 3: Normal Distributions
    Unit 4: Inference
    Unit 5: Linear Regression
    Unit 6: Linear Systems
    Unit 7: Quadratic Regression
    Unit 8: Exponential Regression
    Unit 9: Systems of Nonlinear Equations

5. Developed unit essential questions and student learning goals in alignment with state standards. Examples include, but are not limited to:

    Essential Questions:
    - How can we represent data?
    - How can we calculate the probability of a given event?
    - How can you make an inference on data?
    - How do you know the regression model is appropriate?

- How do you interpret the intercepts of the regression model?
- How does changing the units of the x or y variable affect the model?
- How does adjusting the values of the explanatory or response variables affect the model? (vertical/horizontal shifts)

Student Learning Goals:

- Students will describe a quantitative data set with statistics.
- Students will be able to calculate the probability of an event.
- Students will construct a confidence interval for a population mean.
- Students will run a hypothesis test for a population mean.
- Students will construct a linear regression model to explain the relationship between two variables.
- Students will construct a scatter plot.
- Students will use a linear regression model to predict the value of a response variable.
- Students will determine the most efficient method when solving a system of linear equations.
- Students will apply a quadratic regression to explain the relationship between two variables.
- Students will solve a quadratic equation.
- Students will solve an exponential equation.
- Students will graph exponential functions.
- Students will solve a higher order system of linear equations with a matrix.
- Students will solve a system of nonlinear equations.

6. Selected Stats in Your World as primary resource.