Projects in Algebra 2 and Statistics

Aligning Standards to My Math Classes

Algebra 2 – Lottery Project

- Task: Students analyze the Georgia Fantasy Five lottery, as well as a lottery of their choice. They are then to analyze the pros and cons of the lottery, different issues surrounding the lottery, how the money could have been alternatively spent, and to create a lottery of their own.

Part I: What is a lottery? Students are to read various articles with a partner and gather information surrounding lotteries, their purposes, benefits, and consequences.

Part II: Can playing the lottery be profitable? Students calculate the number of combinations of matching 5, 4, 3, 2, 1 and 0 winning numbers from the Fantasy Five Lottery in Georgia. They are then to calculate the probabilities of each of these combinations as well. Afterwards, they are to find the likelihood of various events and ailments (getting struck by lightning, getting cancer, etc.) in relation to winning all 5 numbers of the Fantasy Five.

Part III: What are some issues surrounding the lottery? Students are assigned readings by their reading level and are required to complete a context, say, mean, matter worksheet in order to construct a 4-paragraph essay discussing the issues in their reading.

Part IV: Who is harmed the most by playing the lottery? Students calculate how much it costs to play the lottery well (how much it would cost have a 30% chance to win 3 numbers), as well as investigate what percentage this is of residents of different levels of income. Students then investigate different forms of financial instruments (CDs and savings accounts) and calculate compound interest on these instruments over a period of 3 years.

Algebra 2 – Lottery Project

- Standards covered:
- CA Algebra 2 –
  - Standard 12: Student knows how the laws of fractional exponents, understand exponential functions, and use these functions in problems involving exponential growth and decay.
  - Standard 19: Students use combinations and permutations to compute probabilities.

Algebra 2 – Lottery Project

- Social Justice Issues:
  - Who is harmed by playing the lottery?
  - What are some issues surrounding the lottery?
  - How else can funds be used aside from purchasing lottery tickets?

Statistics – Survey Project

- Task: Students design a survey surrounding an essential question and analyze the results using boxplots, scatterplots, histograms and linear regression.

1. Think of an Essential Question –
   - What is one question you would like to know about the 11th/12th graders?

     ie:
     - What kind of impact does our diet have on our bodies?
     - Is rest or studying more important when it comes to grades?

2. Identify attributes (variables) that are pertinent for your essential question. **At least five total, two must be quantitative.**
   - For your quantitative variables, make them related to each other so it would make sense on a scatterplot (example: GPA and number of hours studying per night on a scatterplot makes a heck of a lot more sense than GPA and height).

3. Design a questionnaire (survey) to collect data related to these attributes.

4. Select a sampling method to administer the survey.
   - We will be presenting our sampling methods to each other in class for approval.
   - Consider these things:
     - Are there strata that you might want to split your subjects up in before conducting an SRS?
     - Is there any bias in your method?

Statistics – Survey Project

- **Standards covered:**
  - Exploration of Data - Graphing and Numerical Distributions
  - Examining Relationships – Scatter Plots, Correlation; Least-Squares Regression
  - Two-Variable Data – Transformation of Relationships; Cautions About Correlation and Regression; Relations in Categorical Data
  - Production of Data – Designing Samples; Designing Experiments; Simulating Experiments