Mathematical Models with Applications Curriculum Bundle #5

Title	Suggested Dates
Probability and Statistics	November 16 – December 4 (12 days)

Big Idea/Enduring Understanding	Guiding Questions
Probability is a way of expressing knowledge or belief that an event will occur or has occurred based on all possible outcomes.	1. How do you determine the sample space for an experiment in probability? 2. What is the difference between theoretical and experimental probability? 3. How are independent events and dependent events alike and different?
Data can be represented in many formats – graphs, tables, measures of central tendency, etc… - all of which can be informative, but can also be misleading if used incorrectly.	1. How can graphic models be used to misrepresent data and trends in a given situation? 2. When is one measure of central tendency better to use than another in particular situations? When would you want to use median instead of mean? Etc… 3. How does changing a set of data (adding a high point, adding a low point, changing the value of one of the data points, etc…) change the mean, median, mode, and range of a set?

The resources included here provide teaching examples and/or meaningful learning experiences to address the District Curriculum. In order to address the TEKS to the proper depth and complexity, teachers are encouraged to use resources to the degree that they are congruent with the TEKS and research-based best practices. Teaching using only the suggested resources does not guarantee student mastery of all standards. Teachers must use professional judgment to select among these and/or other resources to teach the district curriculum.

Knowledge & Skills with Student Expectations	District Specificity/Examples	Suggested Resources (See note above)
M.2 The student uses graphical and numerical techniques to study patterns and analyze data. M.2A interpret information from various graphs, including line graphs, bar graphs, circle graphs, histograms, scatterplots, line plots, stem and leaf plots, and box and whisker plots to draw conclusions from the data;	• Create graphs to best represent given data sets • Choose best representation for data sets • Interpret data from graphs	**A&M Curriculum** Fall Section 2.2, 2.4 – 2.5 Pearson **Mathematical Models with Applications** Appendix C p. A-25 – A-30

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M.2 The student uses graphical and numerical techniques to study patterns and analyze data. M.2B analyze numerical data using measures of central tendency, variability, and correlation in order to make inferences.	• Mean, median, and mode • Range and variability	**A&M Curriculum** Fall Section 2.1
M.4 The student uses probability models to describe everyday situations involving chance. M.4A compare theoretical and empirical probability	• Independent events and dependent events • Union/intersection (and/or) • Explain the difference between theoretical and experimental both generally and in a specific to a situation. • Interpret experiment results from tables • Relate to proportions. Example: Usually Tommy makes 3 out of 4 free throws, how many free throws would he make at this rate if he shot 20 free throws? • Word problems	**A&M Curriculum** Fall Section 1.1 - 1.5 (very quick review of 1.1-1.2) Pearson **Mathematical Models with Applications** Activity 2.7 and Exercise 2.7 p. 195-199 Region IV/Comap **Modeling with Mathematics – A Bridge to Algebra II** Special Section: Probability p. 571 – 580 (indep/dep)
M.4 The student uses probability models to describe everyday situations involving chance. M.4B use experiments to determine the reasonableness of a theoretical model such as binomial, geometric, etc.	• Binomial (two outcome) experiments • Binomial Distributions Example: You flip a coin 20 times. What is the probability that you get heads 5 times? 10 times? 12 time? Etc.. • Simple geometric distributions Example: You flip a coin 5 times. What is the probability that you get your first head on the 5^{th} flip? On the 10^{th} flip? On the 12^{th} flip?	Pearson **Mathematical Models with Applications** Activity 2.10 (binomial) Appendix A p. 215-220 , p. 216 **TI calculator** Probability Simulation
M.2 The student uses graphical and numerical techniques to study patterns and analyze data. M.2C analyze graphs from journals, newspapers, and other sources to determine the validity of stated arguments	• Ongoing skill	