NJDOE MODEL CURRICULUM PROJECT

CONTENT AREA: Pre-Algebra	GRADE: 7	UNIT #: 4	UNIT NAME: Statistics and Probability

Anticipated ending: Week of February 15

STUDENT LEARNING OBJECTIVES		CORRESPONDING CCSS	
1	Solve multi-step ratio and percent problems using proportional relationships (*simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error).*	7RP.3	Use proportional relationships to solve multistep ratio and percent problems. *Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.*
2	Distinguish between valid and invalid samples from a population by determining if the sample is representative of the subgroups within the population (*e.g. if the class had 50% girls and the sample had 25% girls, then the number of girls was not representative of the whole population*).	7RP.3	Use proportional relationships to solve multistep ratio and percent problems. *Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.*
		7.SP.1	Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.
3	Use random sampling to produce a representative sample, develop valid inferences about a population with an unknown characteristic of interest, and compare the variation in estimates using multiple samples of the same and different size.	7.SP.1	Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.
		7.SP.2	Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. *For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.*
4	Visually and numerically compare the means and variations of two distinct populations (such as the mean height of different sports teams) to draw informal comparative inferences about measures of center and variability using graphical representations and statistical calculations.	7.SP.3	Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. *For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable.*
		7.SP.4	Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. *For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.*

STUDENT LEARNING OBJECTIVES		CORRESPONDING CCSS	
5	Interpret and express the likelihood of a chance event as a number between 0 and 1, relating that the probability of an unlikely event happening is near 0, a likely event is near 1, and 1/2 is neither likely nor unlikely.	7.SP.5	Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.
6	Conduct experimental probability events that are both uniform (*rolling a number cube multiple times*) and non-uniform (*tossing a paper cup to see if it lands up or down*) to collect and analyze data to make predictions for the approximate relative frequency of chance events.	7RP.3,	Use proportional relationships to solve multistep ratio and percent problems. *Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.*
		7.SP.6	Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. *For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times.*
7	Develop uniform and non-uniform theoretical probability models by listing the probabilities of all possible outcomes in an event, for instance, the probability of the number cube landing on each number being 1/6. Then, conduct an experiment of the event using frequencies to determine the probabilities of each outcome and use the results to explain possible sources of discrepancies in theoretical and experimental probabilities.	7.SP7	Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy. a. Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. *For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected.* b. Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. *For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies*
8	Design a simulation of a compound probability event and determine the sample space using organized lists, tables, and tree diagrams, calculate the fractional probabilities for each outcome in the sample space, and conduct the simulation using the data collected to determine the frequencies of the outcomes in the sample space.	7.SP.8	Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.

Major Content **Supporting Content** **Additional Content** (Identified by PARCC Model Content Frameworks). ***Bold type indicates grade level fluency requirements.*** *(Identified by PARCC Model Content Frameworks).*

Selected Opportunities for Connection to Mathematical Practices

1. **Make sense of problems and persevere in solving them.**
   SLO 1 Use problems that have several givens or must be decomposed before solving.
2. **Reason abstractly and quantitatively.**
   SLO 2 Present an argument and provide supporting justification
3. Construct viable arguments and critique the reasoning of others.
4. **Model with mathematics.**
   SLO 5 Determine probability experimentally.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

All of the content presented at this grade level has connections to the standards for mathematical practices.

Bold type identifies possible starting points for connections to the SLOs in this unit.

Greater Brunswick Charter School Curriculum

Grade level: 7 **Subject: Math** **Unit #: 4**

Day	Topic	SLO	Learning Objectives	Essential Questions	Suggested Student Activities		Possible Resources
					Whole Group	Small Group / Stations	
1	Measures of central tendency	4	To compute mean, median, and mode of a set of data and recognize which is the better measure of central tendency for the set.	*How do I know which measure to use to identify the middle?*	These are three of the four core understandings important to this unit.	• Lesson/Guided Practice • Independent Practice • RTI • i-Ready	MathAccelerated 10-1 p.434-439
2	Measures of variability	4	To compute the range and interquartile range of a set of data.	*How can I determine how spread out the data is?*		• Lesson/Guided Practice • Independent Practice • RTI • i-Ready	MathAccelerated 10-2 p.440-446
3	Deviation	4	To compute the mean absolute deviation of a set of data.	*How can I figure out how far apart each data value in the set of data is?*		• Lesson/Guided Practice • Independent Practice • RTI • i-Ready	MathAccelerated 10-3 p.447-451
4	Visual overlap	4	To determine the difference in means between two sets of data.	*How can I see the data on a number line?*	*The important exercise here is the exposure to a method for visualizing the data.*	• Lesson/Guided Practice • Independent Practice • RTI • i-Ready	MathAccelerated p.452-453
5	Box and whisker plots	4	To determine inferences from visual displays of data.	*How can I make a deduction from seeing the data on a number line?*		• Lesson/Guided Practice • Independent Practice • RTI • i-Ready	MathAccelerated 10-4 p.454-460
6	Measures and visual displays	4	To determine mastery of content	*What of the skills over the past few days can I do on my own?*		• Independent Practice • RTI for strugglers • i-Ready	MathAccelerated p. 490-491
7	Measures and visual displays	4				• Review • Assessment	
8	Sampling	2, 3	To make predictions from reliable samples	*How can I be sure the sample I am using to make my prediction is a good sample?*		• Lesson/Guided Practice • Independent Practice • RTI • i-Ready	MathAccelerated 10-5 p.462-466

Grade level: 7				Subject: Math			Unit #: 4
Day	**Topic**	**SLO**	**Learning Objectives**	**Essential Questions**	**Suggested Student Activities**		**Possible Resources**
					Whole Group	**Small Group / Stations**	
9	Sampling	2, 3	To determine the value of multiple samples for making a prediction.	*How do more samples help me have a better idea?*		• Lesson/Guided Practice • Independent Practice • RTI • i-Ready	MathAccelerated p.468-469
10	Probability	5, 6	To determine the probability of an outcome.	*How can I predict what will happen?*	*This is the fourth core understanding in this unit. It is really just a division problem, a fraction.*	• Lesson/Guided Practice • Independent Practice • RTI • i-Ready	MathAccelerated 10-6 p.470-473
11	Making predictions	7	To make predictions from a set of data for a larger group of data.	*How can I take what I know and expand it to a larger situation?*		• Lesson/Guided Practice • Independent Practice • RTI • i-Ready	MathAccelerated 10-7 p.477-480
12	Making predictions	8	To make predictions of multiple events occurring.	*How can I figure how likely two things are to happen?*		• Lesson/Guided Practice • Independent Practice • RTI • i-Ready	MathAccelerated 10-8 p.482-486
13	Simulations	8	To use a simulation to predict what is most likely to be an outcome.	*How does a simulation help me know what is most likely to happen?*		• Lesson/Guided Practice • Independent Practice • RTI • i-Ready	MathAccelerated p.487-489
14	Probability	2, 3, 7, 8	To determine mastery level of content	*How much do I know to use in new situations?*		• Independent Practice • RTI for strugglers • i-Ready	MathAccelerated p.491-492
15	Measures and Probability	2, 3, 4, 5, 6, 7, 8				• Review • Assessment	
16	Simple interest	1	To complete single and multi-step simple interest problems.	*What do I remember about percents?*	*Be sure to require students to set up an equation to find the solution to each problem.*	• Review lesson • Independent Practice • RTI for strugglers • i-Ready	Simple interest problems Simple interest problems
17	Tax, discount	1	To compute the sales tax or discount on purchases	*What do I remember about tax and discounts?*		• Review lesson • Independent Practice • RTI for strugglers • i-Ready	Sales tax and discount problems

Grade level: 7 **Subject:** Math **Unit #:** 4

Day	Topic	SLO	Learning Objectives	Essential Questions	Suggested Student Activities		Possible Resources
					Whole Group	Small Group / Stations	
18	Percent of increase or decrease	1	To compute the percent of increase or decrease between two numbers	*What do I remember about computing the percent of decrease or increase?*		• Lesson/Guided Practice • Independent Practice • RTI • i-Ready	• % up/down worksheet • Multiple worksheets for which you can select the level of difficulty
19	Ratio and percent problems.	1				• Review • Assessment	

Word Wall Candidates

Statistics	Measures of Central Tendency	Measures of variability	Range	Interquartile range
Deviation	Box Plot	Doulbe Box Plot	Sample	Unbiased sample
Random	Stratified random	Systematic random	Probability	Biased sample
Outcome	Complement	Uniform Probability Model	Experiemental probability	Theoretical probability
Simple event	Compound event	Tree diagram	Distribution	Visual overlap

Grade level: 7				Subject: Math			Unit #: 4
Day	**Topic**	**SLO**	**Learning Objectives**	**Essential Questions**	**Suggested Student Activities**		**Possible Resources**
					Whole Group	**Small Group / Stations**	

Authentic Application

Your Goal: To predict the opinion of a student based on sampling from a sample of reliable size.

Your Role: Investigator and researcher

Your Audience: Your classmates

The Situation: Take a sampling of student opinion on a topic of value and interest to you.
Determine the probability of opinion, based on the sampling, by gender and grade level
Your work should result in at least four predictions on those two subsets.

Your Product: The likelihood that a student of specific grade level and gender will have a specific opinion on your topic.

Success Criteria:

CATEGORY	3	2	1
Research	The sampling unbiased and large enough in each subset to provide a reliable prediction	The sampling is biased or too small to be adequate.	The sampling is biased and too small to be adequate.
Calculations	All calculations are correct	The calculations are largely correct, but contain small errors.	No calculations are correct
Presentation	The visual presentation of the data and prediction are clear and persuasive.	The visual presentation is lacking or the prediction is in error.	The visual presentation is lacking and the prediction is in error.