NJDOE MODEL CURRICULUM PROJECT

CONTENT AREA: Mathematics	GRADE: 8	UNIT #: 5	UNIT NAME: Statistics and Geometry

	STUDENT LEARNING OBJECTIVES		CORRESPONDING CCSS
1	Using a linear equation to model real life problems then solve it by interpreting the meaning of the slope and the intercept.	8.SP.3	Use the equation of a linear model to solve problems in the context of bivariate data interpreting the slope and intercept. For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height.
2	Construct and interpret scatter plots for bivariate measurement data and identify and interpret data patterns (clustering, outliers, positive or negative association, possible lines of best fit, and nonlinear association).	8.SP.1	Construct and interpret scatter plot for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.
		8.SP.2	Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.
3	Construct frequency/relative frequency tables to analyze and describe possible associations between two variables.	8.SP.4	Understand the patterns of association can also be seen in bivariate categorical data by displaying the frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables. *For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores?*
4	Know and apply the appropriate formula for the volume of a cone, a cylinder, or a sphere to solve real-world and mathematical problems.	**8.G.9**	Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.

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 4 Involve problems that must be constructed and deconstructed in order to solve.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. **Model with mathematics.**
    SLOs 1, 2 and 3 Use equations, scatter plots, and frequency tables to model relationships between real-world quantities.
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: 8			Subject: Math				Unit # 5	

Day	Topic	SLO	Learning Objectives	Essential Questions	Suggested Student Activities		Possible Resources
					Whole Group	**Small Group**	
1	Readiness for unit		To determine the level of readiness of students	*Do I know enough to begin this unit?*		• Vocabulary review • Independent practice • Intervention for strugglers • i-Ready	Glencoe Math p.660-662
2	Plotting relationships	2	To view a relationship between two data sets by using a coordinate plane graph	*How can I use a graph to see data trends?*		• Lesson & Guided practice • Independent practice • Intervention/Enrichment • i-Ready	Glencoe Math p.663-664
3	Scatter plots	2	To plot points from two sets of data and discern a relationship	*How do patterns demonstrate trends?*		• Lesson & Guided practice • Independent practice • Intervention/Enrichment • i-Ready	Glencoe Math p.665-670
4	Scatter plots	2	To plot points from two sets of data and discern a relationship	*How do patterns demonstrate trends?*		• Detailed homework review • Independent practice • Intervention/Enrichment • i-Ready	Glencoe Math p.671-673
5	Line of best fit	1, 2	To discover the line of best fit from common sense	*How does the line of best fit help me predict a trend?*		• Lesson & Guided practice • Independent practice • Intervention/Enrichment • i-Ready	Glencoe Math p.675-676
6	Line of best fit	1, 2	To determine a value from a relationship using a line of best fit	*How does the line of best fit help me predict a trend?*		• Detailed homework review • Independent practice • Intervention/Enrichment • i-Ready	Glencoe Math p.677-680
7	Line of best fit	1, 2	To determine a value from a relationship using a line of best fit	*How does the line of best fit help me predict a trend?*		• Detailed homework review • Independent practice • Intervention/Enrichment • i-Ready	Glencoe Math p.680-683

Grade Level: 8					Subject: Math		Unit # 5

Day	Topic	SLO	Learning	Essential	Suggested Student Activities		Possible Resources
8	Scatter plots in technology	1, 2	To use a calculator to construct a scatter plot and determine a line of best fit	*Does a calculator help me do this faster?*	*This is optional but discussing the correlation coefficient has some lasting value.*	• Lesson & Guided practice • Independent practice • Intervention/Enrichment • i-Ready	Glencoe Math p.685-688
9	• Scatter plots • Line of best fit	1, 2				• Independent practice • Intervention for strugglers • i-Ready	KhanAcademy Scatter Plots MathIsFun ScatterPlots Illuminations LineofBestFit KhanAcademy LineofBestFit Engage NY module
10	• Scatter plots • Line of best fit					• Review • Assessment	
11	Relative frequency	3	To interpret relative frequencies	How do I determine patterns using data comparing two quantities		• Lesson & Guided practice • Independent practice • Intervention/Enrichment • i-Ready	Glencoe Math p.689-694
12	Relative frequency	3	To interpret relative frequencies	How do I determine patterns using data comparing two quantities		• Detailed homework review • Independent practice • Intervention/Enrichment • i-Ready	• Glencoe Math p.695
13	Scatter Plots and Lines of best fit	2	To solve real-life situations using new plotting skills	*How can I use graphs to help figure out a real situation?*		• Lesson & Guided practice • Independent practice • Intervention/Enrichment • i-Ready	Glencoe Math p.697-699
14	Review of measures of central tendency	NA	To compute five measures of central tendency	*Do I remember mean, median, mode, quartiles, box plots, etc?*	*Take an extra day if they don't. If they can't do mean and quartiles, deviation is going to be a big stumble.*	• Lesson & Guided practice • Independent practice • Intervention/Enrichment • i-Ready	Glencoe Math p.701-707

					Grade Level: 8	Subject: Math		Unit # 5

Day	Topic	SLO	Learning	Essential	Suggested Student Activities		Possible Resources
15	• Mean Absolute Deviation • Standard Deviation	NA	• To compute the mean absolute deviation • To identify data within a standard deviation	• *How do I compute the mean absolute deviation?* • *What does the standard deviation actually tell me?*	*Neither of these are in the Model Curriculum. However, standard deviation is often mentioned in a lot of contexts. There is no harm in helping students understand what it is intended to show.*	• Lesson & Guided practice • Independent practice • Intervention/Enrichment • i-Ready	Glencoe Math p.709-713 MAD worksheet
16	• Mean Absolute Deviation • Standard Deviation	NA	• To compute the mean absolute deviation • To identify data within a standard deviation	• *How do I compute the mean absolute deviation?* • *What does the standard deviation actually tell me?*	*These lessons do not ask students to compute the standard deviation – only to use it.*	• Detailed homework review • Independent practice • Intervention/Enrichment • i-Ready	Glencoe Math p.715
17	Describing data distributions	NA	To identify key characteristics in a graph of data	*What do some characterisitics of data tell me?*		• Lesson & Guided practice • Independent practice • Intervention/Enrichment • i-Ready	Glencoe Math p.717-724
18	Relative frequency Mean absolute deviation	1, 2, 3				• Independent practice • Intervention for strugglers • i-Ready	MathIsFun RelativeFrequency Mathway RelativeFrequency KhanAcademy TwoWayTables MAD worksheets
18	Relative frequency Mean absolute deviation					• Review • Assessment	Glencoe Math p.
19	Content readiness		To determine prior knowledge	*How much do I know about cones, cylinders, spheres and their volumes?*		• Independent practice • Intervention/Enrichment • i-Ready	Glencoe Math p.584-586
20	Definitions of conic sections	4	To determine the characteristics of a conic section	*How is a cone, cylinder, and sphere made?*	*In high school, with any rigor, they'll hear about conic sections. You may as well show them why they're called that.*	• Lesson & Guided practice • Independent practice • Intervention/Enrichment • i-Ready	Glencoe Math p.587-588

			Grade Level: 8		Subject: Math		Unit # 5

Day	Topic	SLO	Learning Objective	Essential Question	Suggested Student Activities		Possible Resources
21	Volume of a cylinder	4	To calculate the volume of a cylinder	*Why would I need to know the volume of a cylinder?*	*Compare the formula for a volume of a cylinder to the formula for the volume of a rectangular prism standing on its end. Then it won't seem like a new formula. It's still the area of the base multiplied by the height, It's just a different base.*	• Lesson & Guided practice • Independent practice • Intervention/Enrichment • i-Ready	Glencoe Math p.589-594
22	Volume of a cylinder	4	To calculate the volume of a composite solid that includes a cylinder	*What real world shapes have volumes I can calculate?*	*Make up a lot of composite figures for the speedier learners.*	• Lesson & Guided practice • Independent practice • Intervention/Enrichment • i-Ready	Glencoe Math p.595-596 Page 2 problems
23	Volume of a cone	4	To calculate the volume of a cone	*How is a cone like a pyramid?*	*Compare the formula for a volume of a cone to the formula for the volume of a pyramid. Then it won't seem like a new formula. It's still the area of the base multiplied by 1/3 of the height, It's just a different base.*	• Lesson & Guided practice • Independent practice • Intervention/Enrichment • i-Ready	Glencoe Math p.597-604
24	Volume of a sphere	4	To calculate the volume of a sphere	*How much can I put into a hollow ball?*		• Lesson & Guided practice • Independent practice • Intervention/Enrichment • i-Ready	Glencoe Math p.605-612
25	Volumes of cones, cylinders, and spheres	4	To calculate the volume of composite figure made of these and prisms.	*How do figures fit together?*		• Lesson & Guided practice • Independent practice • Intervention/Enrichment • i-Ready	Sheet 1, Sheet 2, Sheet 3
26	Composite figures in real life	4	To solve real world problems involving composite figure volumes	*When will I use these skills?*		• Lesson & Guided practice • Independent practice • Intervention/Enrichment • i-Ready	Glencoe Math p.613-615
27	Volumes of cones, cylinders, and spheres	4	To compute the volume of conic sections	*Do I know how to do this well enough?*		• Independent practice • Intervention/Enrichment • i-Ready	All the volume computation worksheets you could want

					Grade Level: 8	Subject: Math		Unit # 5	

Day	Topic	SLO	Learning	Essential	Suggested Student Activities	Possible Resources
28	Volumes of cones, cylinders, and spheres	4			• Review • Assessment	
29	Unwrapping a figure	NA	To unwrap figures to see the surface area.	*What does it look like when I cut apart of figure and lay it out flat?*	*The rest of the chapter is not in the Model Curriculum. You have time and it is interesting content. So, you may as well use it.* • Lesson & Guided practice • Independent practice • Intervention/Enrichment • i-Ready	Glencoe Math p.617-618
30	Surface area of a cylinder	NA	To compute the total area of the surfaces of a cylinder	*How much material does it take to make a can?*	• Lesson & Guided practice • Independent practice • Intervention/Enrichment • i-Ready	Glencoe Math p.619-626
31	Nets of cones	NA	To determine how to find the area around a cone's surface	*How much like a circle is a cone if I lay it out flat?*	• Lesson & Guided practice • Independent practice • Intervention/Enrichment • i-Ready	Glencoe Math p.627-630
32	Surface area of a cone	NA	To compute the total area of the surfaces of a cone	*What is the best shape for a cone with an amount of material to get me the most ice cream?*	• Lesson & Guided practice • Independent practice • Intervention/Enrichment • i-Ready	Glencoe Math p.631-638
33	Changes in scale	NA	To determine the change in volume when linear dimensions of a figure are changed	*What is the relationship between a linear change and a three-dimensional change?*	• Lesson & Guided practice • Independent practice • Intervention/Enrichment • i-Ready	Glencoe Math p.639-640
34	Changes in dimension	NA	To calculate new volume when dimension changes are made	*What is the relationship between a linear change and a three-dimensional change?*	• Lesson & Guided practice • Independent practice • Intervention/Enrichment • i-Ready	Glencoe Math p.641-647
35	Surface area	NA	To calculate the surface area of conic sections		• Independent practice • Intervention/Enrichment • i-Ready	

Grade Level: 8					Subject: Math		Unit # 5
Day	Topic	SLO	Learning	Essential	Suggested Student Activities		Possible Resources
36	Surface area	NA			• Review • Assessment		

Word Wall Candidates

Qualitative data	Quantitative data	Distribution	Two way table	Five number summary
Line of best fit	Symmetric	Scatter Plot	Relative frequency	
Standard Deviation	Mean Absolute Deviation	Bivariate data	Univariate data	
Cone	Cylinder	Sphere	Volume	Composite solid

Authentic Application

Your goal: To find the composite figure that uses the least material while holding a specified volume of a product.

Your role: Member of a team.

Your audience: The members of the class.

The situation: Your team must select two figures to combine into a composite figure.
Select one of the following volumes for your composite figure to hold: $10\ in^3$, $20\ in^3$, $25\ in^3$, or $30\ in^3$
Find or calculate the figure that will hold the amount of material (volume) you've chosen your figure to hold while using the least amount of material (surface area) to make the composite figure.
Construct the composite figure from construction paper. Use a different color for each part of your composite figure.

Your Product: Proof that the dimensions of your figure require the least amount of material for the volume it will hold.
The neatly completed construction of your composite figure.

Success Criteria: Scoring rubric:

	4 points	3 points	2 points	1 point
Calculation	The composite figure uses the least required material	The composite figure uses the least required material but it doesn't fit together well	The composite figure doesn't use the least required material.	The composite figure doesn't use the least required material and It doesn't fit together well
Construction	The construction is done very neatly and the colors are well selected.	< -->		The construction is done very poorly and it is monochrome.