Winslow Township School District

Mathematics Curriculum – Algebra III/Trigonometry

Unit 4

<table>
<tr><th>Overview</th><th colspan="2">Standards for Mathematical Content</th><th>Unit Focus</th><th>Standards for Mathematical Practice</th></tr>
<tr><td><u>Unit 4</u>

Statistics, Circuits, & Voting</td><td>• S.CP.A
• S.CP.B
• S.MD.A
• S.MD.B
• S.IC.A.1
• S.IC.A.2
• S.IC.B.3</td><td>• S.IC.B.4
• S.ID A.4
• S.ID.B.5
• S.ID.C.8
• S.ID.C.9
• F.IF.C.7</td><td>• Solve problems involving combinations and probability problems involving combinations.
• Solve problems using the binomial probability formula.
• Understand sampling techniques and the misuses of statistics.
• Construct frequency distributions, histograms, and stem-and-leaf displays.
• Calculate the measures of central tendency of a set of data.
• Calculate the measures of position of a set of data.
• Calculate the range and standard deviation of a set of data.
• Understand properties of a normal distribution.
• Calculate a z-score and use it to determine the area under a normal curve.
• Understand linear correlation and calculate its coefficient.
• Understand linear regression and calculate the line of best fit.
• Represent problems using graphs.
• Understand paths, circuits, and bridges.
• Solve problems involving Euler paths and circuits.
• Understand Hamilton paths and circuits.
• Use trees to represent real-life problems and solve problems involving spanning trees.
• Use the plurality method, the Borda count method, the plurality with elimination method, and the pairwise comparison method to determine the winner of an election.
• Use tie-breaking procedures for an election.
• Determine if the results of an election violate the majority, the head-to-head, the monotonicity, or the irrelevant alternatives criteria.
• Solve apportionment problems using Hamilton’s, Jefferson’s, Webster’s, and Adams’ methods.
• Determine if a given apportionment demonstrates the Alabama, population, or new-states paradox.</td><td>MP.1 Make sense of problems and persevere in solving them.

MP.2 Reason abstractly and quantitatively.

MP.3 Construct viable arguments and critique the reasoning of others.

MP.4 Model with mathematics.

MP.5 Use appropriate tools strategically.

MP.6 Attend to precision.

MP.7 Look for and make use of structure.

MP.8 Look for and express regularity in repeated reasoning.</td></tr>
<tr><td><u>Unit 4:</u>
Suggested Open Educational Resources</td><td colspan="2">S.ID.B.5 Support for a Longer School Day?
S.CP.A.2 The Titanic 2
S.CP.B.9 Alex, Mel, and Chelsea Play a Game</td><td>S.IC.A.1, S.IC.B.3 Strict Parents
S.IC.A.2 Block Scheduling
S.IC.B.4 The Marble Jar
S.ID.A.4 SAT Scores
S.MD.A, S.MD.B Fred's Fun Factory</td><td>S.ID.B.5 Support For a Longer School Day?
S.ID.C.8, S.ID.C.9 Coffee and Crime
S.ID.C.9 Math Test Grades
F.IF.C.7 Running Time</td></tr>
</table>

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Curriculum Unit 4	Standards		Pacing	
			Days	Unit Days
Unit 4 **Modeling with Statistics**	F.IF.C.7	• Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.	3	45
	S.CP.A S.CP.B	• Understand independence and conditional probability and use them to interpret data • Use the rules of probability to compute probabilities of compound events in a uniform probability model	7	
	S.IC.A.1 S.IC.A.2 S.IC.B.3 S.IC.B.4	• Understand statistics as a process for making inferences about population parameters based on a random sample from that population. • Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. For example, a model says a spinning coin falls heads up with probability 0.5. Would a result of 5 tails in a row cause you to question the model? • Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each. • Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.	10	
	S.ID A.4 S.ID.B.5 S.ID.C.8 S.ID.C.9	• Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve. • Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data. • Compute (using technology) and interpret the correlation coefficient of a linear fit. • Distinguish between correlation and causation.	8	
	S.MD.A S.MD.B	• Calculate expected values and use them to solve problems • Use probability to evaluate outcomes of decisions	7	
	Assessment, Re-teach and Extension		10	

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<table>
<tr><th colspan="6">Unit 4 Algebra III/Trigonometry</th></tr>
<tr><th colspan="3">School/District Formative Assessment Plan</th><th colspan="3">School/District Summative Assessment Plan</th></tr>
<tr><td colspan="3">Pre-Assessment, Quizzes
Exit Tickets
Daily Monitoring</td><td colspan="3">Unit Benchmark
SAT Testing
ACT Testing</td></tr>
<tr><th colspan="3">District/School Tasks</th><th colspan="3">District/School Primary and Supplementary Resources and Technology Integration</th></tr>
<tr><td colspan="3">NJDOE Digital Item Library
https://nj.digitalitemlibrary.com/home

NJSLA Mathematics Evidence Statements
https://docs.google.com/spreadsheets/d/18M5r1jk4P729fTpAlWAzrw1gE6tken233I-Yk0U712M/edit#gid=554025491</td><td colspan="3">Textbook
Khan Academy
https://www.khanacademy.org/
NJSLA Resources:
https://nj.mypearsonsupport.com/practice-tests/math/
Diversity, Equity & Inclusion Educational Resources
https://www.nj.gov/education/standards/dei/</td></tr>
<tr><th colspan="6">Instructional Best Practices and Exemplars</th></tr>
<tr><td colspan="3">1. Identifying similarities and differences
2. Summarizing and note taking
3. Reinforcing effort and providing recognition
4. Homework and practice
5. Nonlinguistic representations</td><td colspan="3">6. Cooperative learning
7. Setting objectives and providing feedback
8. Generating and testing hypotheses
9. Cues, questions, and advance organizers
10. Manage response rate</td></tr>
<tr><th colspan="6">Vocabulary</th></tr>
<tr><td>Combination
Probability distribution
Statistics
Data
Population
Unbiased sample
Random sample
Systematic sample
Cluster sample
Stratified sampling
Convenience sample
Frequency distribution</td><td>Histogram
Frequency polygons
Stem-and-leaf display
Circle graph
Measures of central tendency
Arithmetic mean
Median
Mode
Bimodal
Midrange
Measures of position</td><td>Quartiles
Measures of dispersion
Range
Standard deviation
Rectangular distribution
Skewed distribution
Gaussian distribution
z-scores
correlation
regression
bivariate
Percentiles</td><td>critical values
absolute value
linear regression
line of best fit
graph
connected
disconnected
traversable
Euler path
Euler circuit
Weighted graph</td><td>Hamilton path
Hamilton circuit
Tree
Spanning tree
Majority
Preference table
Plurality method
Borda count
Runoff election
Fairness criteria
Majority criterion</td><td>Head-to-head criterion
Straw vote
Apportionment
Standard divisor
Standard quota
Quota rule
Modified divisor
Modified quotas
Alabama paradox
Population paradox
New-states paradox</td></tr>
</table>

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9.1 Personal Financial Literacy, 9.2 Career Awareness, Exploration, Preparation and Training & 9.4 Life Literacies and Key Skills
9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a). 9.4.12.CI.3: Investigate new challenges and opportunities for personal growth, advancement, and transition (e.g., 2.1.12.PGD.1). 9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a). 9.4.12.DC.6: Select information to post online that positively impacts personal image and future college and career opportunities. 9.4.12.IML.7: Develop an argument to support a claim regarding a current workplace or societal/ethical issue such as climate change (e.g., NJSLSA.W1, 7.1.AL.PRSNT.4). 9.4.12.TL.2: Generate data using formula-based calculations in a spreadsheet and draw conclusions about the data. 9.4.12.TL.3: Analyze the effectiveness of the process and quality of collaborative environments. The implementation of the 21st Century skills and standards for students of the Winslow Township District is infused in an interdisciplinary format in a variety of curriculum areas that include, English language Arts, Mathematics, School Guidance, Social Studies, Technology, Visual and Performing Arts, Science, Physical Education and Health, and World Language. Additional opportunities to address 9.1, 9.2 & 9.4: **Philadelphia Mint** https://www.usmint.gov/learn/kids/resources/educational-standards **Different ways to teach Financial Literacy.** https://www.makeuseof.com/tag/10-interactive-financial-websites-teach-kids-money-management-skills/
Suggested Modifications for Special Education/504
Students with special needs: The students' needs will be addressed on an individual and grade level using a variety of modalities. Accommodations will be made for those students who need extra time to complete assignments. Support staff will be available to aid students related to IEP specifications. 504 accommodations will also be attended to by all instructional leaders. Physical expectations and modifications, alternative assessments, and scaffolding strategies will be used to support this learning. The use of Universal Design for Learning (UDL) will be considered for all students as teaching strategies are considered. ☐ Provide the opportunity to re-take tests ☐Modify activities/assignments/projects/assessments ☐ Breakdown activities/assignments/projects/assessments into manageable units ☐Additional time to complete activities/assignments/projects/assessments ☐ Provide an option for alternative activities/assignments/projects/assessments ☐ Modify Content ☐ Modify Amount ☐ Small Group Intervention/Remediation ☐ Individual Intervention/Remediation ☐ Additional Support Materials ☐ Guided Notes ☐ Graphic Organizers ☐ Adjust Pacing of Content ☐ Increase one on one time ☐ Peer Support ☐ Other Modifications for Special Education:

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Suggested Modifications for At-Risk Students

Formative and summative data will be used to monitor student success. At first signs of failure, student work will be reviewed to determine support. This may include parent consultation, basic skills review and differentiation strategies. With considerations to UDL, time may be a factor in overcoming developmental considerations

☐ Provide the opportunity to re-take tests
☐ Increase one on one time
☐ Oral prompts can be given
☐ Using visual demonstrations, illustrations, and models
☐ Give directions/instructions verbally and in simple written format
☐ Peer Support
☐ Modify activities/assignments/projects/assessments
☐ Additional time to complete activities/assignments/projects/assessments
☐ Provide an option for alternative activities/assignments/projects/assessments
☐ Modify Content
☐ Modify Amount
☐ Adjust Pacing of Content
☐ Small Group Intervention/Remediation
☐ Individual Intervention/Remediation
☐ Additional Support Materials
☐ Guided Notes
☐ Graphic Organizers
☐ Other Modifications for Students At-Risk:

Suggested for English Language Learners

All WIDA Can Do Descriptors can be found at this link:
https://wida.wisc.edu/teach/can-do/descriptors

☐ Grades 9-12 WIDA Can Do Descriptors:
- ☐ Listening ☐ Speaking
- ☐ Reading ☐ Writing
- ☐ Oral Language

Students will be provided with accommodations and modifications that may include:

- Relate to and identify commonalities in mathematics studies in student's home country
- Assist with organization
- Use of computer
- Emphasize/highlight key concepts
- Teacher Modeling
- Peer Modeling
- Label Classroom Materials - Word Walls

Suggested Modifications for Gifted Students

Students excelling in mastery of standards will be challenged with complex, high level challenges related to the topic.

- Raise levels of intellectual demands
- Require higher order thinking, communication, and leadership skills
- Differentiate content, process, or product according to student's readiness, interests, and/or learning styles
- Provide higher level texts
- Expand use of open-ended, abstract questions
- Critical and creative thinking activities that provide an emphasis on research and in-depth study
- Enrichment Activities/Project-Based Learning/ Independent Study

Additional Strategies may be located at the links:

- ❖ Gifted Programming Standards
- ❖ Webb's Depth of Knowledge Levels and/or Revised Bloom's Taxonomy
- ❖ REVISED Bloom's Taxonomy Action Verbs

Suggested Activities

☐ Do Now/Warm-Up ☐ Whole Group ☐ Small Groups	☐ Independent Practice ☐ Guided Practice	☐ Centers ☐ Intervention/Remediation ☐ Projects	☐Academic Games ☐ Other Suggested Activities:

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Interdisciplinary Connections
Interdisciplinary Connections: ELA **NJSLSA.R1**. Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text. **NJSLSA.W2.** Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content **NJSLSA.L1**. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking **SL.9-10.4:** Present information, findings and supporting evidence clearly, concisely and logically. The content, organization, development and style are appropriate to task, purpose and audience. **NJSLSA.L6:** Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when encountering an unknown term important to comprehension or expression.
Integration of Computer Science and Design Thinking NJSLS 8
8.1.12.AP.1: Design algorithms to solve computational problems using a combination of original and existing algorithms. 8.1.12.AP.2: Create generalized computational solutions using collections instead of repeatedly using simple variables. 8.1.12.AP.8: Evaluate and refine computational artifacts to make them more usable and accessible. 8.1.12.AP.5: Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects. 8.1.12.DA.1: Create interactive data visualizations using software tools to help others better understand real world phenomena, including climate change. 8.1.12.DA.5: Create data visualizations from large data sets to summarize, communicate, and support different interpretations of real-world phenomena. 8.1.12.DA.6: Create and refine computational models to better represent the relationships among different elements of data collected from a phenomenon or process. 8.2.12.EC.3: Synthesize data, analyze trends, and draw conclusions regarding the effect of a technology on the individual, culture, society, and environment and share this information with the appropriate audience.