Winslow Township School District
Statistics I
Unit 4 – Making Inferences and Justifying Conclusions

Overview: In this unit, students will be able to interpret a confidence level in context. Students will be able to determine critical values for calculating a confidence interval using a table or your calculator. Students will be able to state correct hypotheses for significance test about a population proportion or mean (one or two means or proportions). Students will be able to interpret p-values, Type I and Type II errors in context.

Unit 4 – **Making Inferences and Justifying Conclusions**

Overview	Standards	Unit Focus	Essential Questions
Unit 4	S.IC.A S.IC.A.1 S.IC.A.2 S.IC.B S.IC.B.3 S.IC.B.4	• Understand and evaluate random processes underlying statistical experiments. • 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. • Make inferences and justify conclusions from sample surveys, experiments, and observational studies. • 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.	• Which data collection method is best used for a specific context? • How does randomization relate to a data collection method? • How is a population mean estimated from data from a sample survey? • How important is confidence interval in estimation? • How do you decide which type of testing to perform? • Which type of test is best and why?
Unit 4: Enduring Understandings	Examine the variability of individual elements and their related standardized test statistics when those elements are drawn randomly from a given normally-distributed population. Constructing and comparing confidence intervals Applying assumptions to justify what CI to use based on the given information Describe Margin of Error and determine sample sizes necessary Apply Margin of Error and determine sample sizes necessary to estimate population parameters. Understand the basics of all hypothesis testing including one and two proportions or means. Use real-life applications to help understand basics of all testing including Chi-Squared. Explain thought processes and write out conclusions.	

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Curriculum Unit 4	Standards		Pacing	
			Days	**Unit Days**
Unit 4:	S.IC.A	Understand and evaluate random processes underlying statistical experiments.	20	45
	S.IC.A.1	Understand statistics as a process for making inferences about population parameters based on a random sample from that population.		
	S.IC.A.2	Decide if a specified model is consistent with results from a given data-generating process.		
	S.IC.B	Make inferences and justify conclusions from sample surveys, experiments, and observational studies.	10	
	S.IC.B.3	Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.	5	
	S.IC.B.4	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.	5	
		Assessment, Re-teach and Extension	5	

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Unit 4 Statistics1	
District/School Formative Assessment Plan	**District/School Summative Assessment Plan**
Pre-Assessment Quizzes, Tests Projects Exit Tickets Daily Monitoring	Unit Benchmark SAT Testing AP Testing
Resources	**Activities**
Textbooks: **Statistics**, Peck,Short, Olsen, 2019, Cengage Learning, Inc. ➢ TI 84+ ➢ Smartboard Technology ➢ Desmos ➢ https://www.khanacademy.org/math/statistics ➢ **Diversity, Equity & Inclusion Educational Resources** https://www.nj.gov/education/standards/dei/	• Examine the variability of individual elements and their related standardized test statistics when those elements are drawn randomly from a given normally-distributed population. • Constructing and comparing confidence intervals • Applying assumptions to justify what CI to use based on the given information Describe Margin of Error and determine sample sizes necessary. • Apply Margin of Error and determine sample sizes necessary to estimate pop. Parameters. • Understand the basics of hypothesis testing for one or two means or proportions. • Use real-life applications to help understand basics of all testing to include Chi Squared. • Explain thought processes and write out conclusions.

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Instructional Best Practices and Exemplars	
1. Identifying similarities and differences	6. Cooperative learning
2. Summarizing and note taking	7. Setting objectives and providing feedback
3. Reinforcing effort and providing recognition	8. Generating and testing hypotheses
4. Homework and practice	9. Cues, questions, and advance organizers
5. Nonlinguistic representations	10. Manage response rates

9.1 Personal Financial Literacy, 9.2 Career Awareness, Exploration, Preparation and Training, 9.3 21st Century Life and Careers & 9.4 Life Literacies and Key Skills

9.3.ST.2: Use technology to acquire, manipulate, analyze and report data.
9.3.ST-ET.5: Apply the knowledge learned in STEM to solve problems.
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.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a).
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/

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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 assignment. 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.

- Small group instruction and demonstration
- Electronic, printed and verbal instruction
- One-on-one demonstration
- Leveled informational texts and videos via online
- Modeling and guided practice
- Read directions aloud
- Repeat, rephrase and clarify directions
- Extended time as needed
- Break down assignments into smaller units
- Provide shortened assignments
- Modify testing format
- Preferential seating
- Graphic organizers
- Study guides, study aids and re-teaching as needed

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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. More time will be made available with a certified instructor to aid students in reaching the standards.

- Contact parents, guidance & child study if students are in danger of failing.

- Provide an assignment sheet with step-by-step instructions as well as specifications for each project.

- Provide design templates.

- Provide study guides.

- Provide extended time for written assessments.

- Extended time as needed

- Read directions aloud

- Assist with organization

- Use of computer to create, edit and store student work.

- Emphasize/highlight key concepts

- Recognize success

- Provide timelines for work completion

- Break down multi-step tasks into smaller chunks

- Provide copy of class notes and graphic organizer

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English Language Learners	Modifications for Gifted Students

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 Architectural & Engineering studies in student's home country   - Use sentence/paragraph frames to assist with writing reports.   - Work with a partner to develop and understand written and design projects   - Provide extended time for written responses.   - Assist with organization   - Use of computer for quick translation   - Emphasize/highlight key concepts   - Teacher Modeling   - Peer Modeling   - Label Classroom Materials - Word Walls
	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

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Interdisciplinary Connections

ELA

NJSLSA.SL1 Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

NJSLSA.SL2 Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.

NJSLSA.R7. Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.

NJSLSA.R10. Read and comprehend complex literary and informational texts independently and proficiently with scaffolding as needed.

NJSLSA.W4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience

RI.9-10.1 Accurately cite strong and thorough textual evidence, (e.g., via discussion, written response, etc.) and make relevant connections, to support analysis of what the text says explicitly as well as inferentially, including determining where the text leaves matters uncertain.

RI.9-10.2 Determine a central idea of a text and analyze how it is developed and refined by specific details; provide an objective summary of the text.

W.9-10.6 Use technology, including the Internet, to produce, share, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.

SL.9-10.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance findings, reasoning, and evidence and to add interest.

SL.9-10.6 Adapt speech to a variety of contexts and tasks, demonstrating command of formal English.

RI.11-12.1 Accurately cite strong and thorough textual evidence, (e.g., via discussion, written response, etc.), to support analysis of what the text says explicitly as well as inferentially, including determining where the text leaves matters uncertain.

RI.11-12.2 Determine two or more central ideas of a text, and analyze their development and how they interact to provide a complex analysis; provide an objective summary of the text.

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.5: Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects.

8.1.12.AP.8: Evaluate and refine computational artifacts to make them more usable and accessible.

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.