Marking Period	Unit Title	Recommended Instructional Days
4	Data Analysis and Statistics	14-15 days

Domain:		Recommended Activities, Investigations, Interdisciplinary Connections, and/or Student Experiences to Explore NJSLS-CLKS within Unit
NJSLS Strand: **S-ID.1** Represent data with plots on the real number line (dot plots, histograms, and box plots. **S-ID.2** Use statistics appropriate to the shape of the data distributions to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets. **S-ID.3** Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers). **S-ID.4** 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. **S-IC. 1 Understand** statistics as a process for making inferences about population parameters based on a random sample from that population.	*Progress Indicator:* *Tests ● Quizzes ● Practice problems for homework ● Online textbook ● Worksheets ● IXL ● Leveled assessments*	**Essential Question/s:** **What questions can you answer by using statistics and normal distribution?** **Activity Description**: Statistical questions and variables Statistical studies and sampling methods Data distributions Normal distributions Margin of error Introduction to hypothesis testing **Interdisciplinary Connections:** **Business Domain** **Financial Institutions** An investment consultant firm claims that it will increase the returns on its clients' investments to an average of 20% of the original investments, with minimal risk involved. In a random sample of 50 clients of the firm, the average return on investments with minimal risk was 18.5% of the original investment, with a standard deviation of 4%. What is the z-value rounded to the nearest hundredth, and is there enough evidence to reject the firm's claim?

S-IC. 3 Recognize the purposes and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.

S-IC. 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.

S-IC. 5 Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant

S-IC. 6 Evaluate reports based on data

S-MD.4 (+) Develop a probability distribution for a random variable defined for a sample space in which probabilities are assigned empirically, find the expected values. *For example, find a current data distribution on the expected number of sets per household. How many TV sets would you expect to find in 100 randomly selected households?*

S-MD.5 (+) Weigh the possible outcomes of a decision by assigning

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Answer: -2.65; yes
The SAT is designed so that scores are normally distributed with a mean of 500 and a standard deviation of 100.

a) What percent of SAT scores are between 300 and 500?

b) What is the probability that an SAT score is below 700?

c) What is the probability that an SAT score is less that 400 or greater than 600?

Answer:
a) about 47.7%
b) about 97.7%
c) about 31.8%

Example Tasks:
At the end of each topic please review the Assessment Practice and Performance Tasks questions.

Mixed Review Available Online

✓ ASSESSMENT PRACTICE

29. Does each five-number summary represent a data distribution that is normally distributed? Check *Yes* or *No*.

	Yes	No		Yes	No
2; 7; 8; 9; 10	❑	❑	1; 5; 9; 13; 17	❑	❑
2; 4; 6; 8; 10	❑	❑	1; 5; 6; 7; 9	❑	❑

probabilities to payoff values and finding expected values.

a. Find the expected payoff for a game of chance. *For example, find the expected winning from a state lottery ticket or a game at a fast-food restaurant.*

b. Evaluate and compare strategies on the basis of expected values. *For example, compare a high-deductible versus a low-deductible automobile insurance policy using various, but reasonable, chances of having a minor or a major accident.*

S-MD.6 (+) Use probabilities to make fair decisions (e.g., drawing by lots, using random number generator).

S-MD.7 (+) Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).

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Mixed Review Available Online

☑ **ASSESSMENT PRACTICE**

32. A normally distributed data set has a mean of 35 and a standard deviation of 5.23. Complete the table to find the probability that a randomly selected value is in the given interval. Round to the nearest hundredth percent, if necessary.

Interval	Probability (%)
at most 43	
at least 48	
between 32 and 38	
at least 41.6	
between 30.2 and 42.6	
at most 36.25	

31. Performance Task A voice coach looks up the ages of all the contestants on a popular singing competition and creates two graphs by grouping the data differently.

Contestant Ages

Age (years)

Contestant Ages

Age (years)
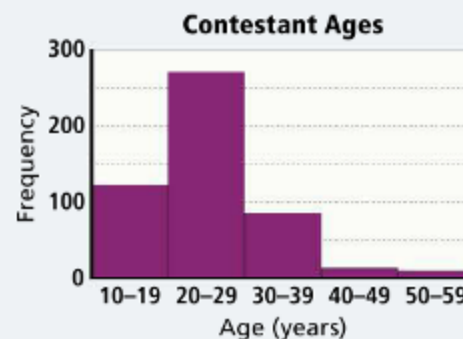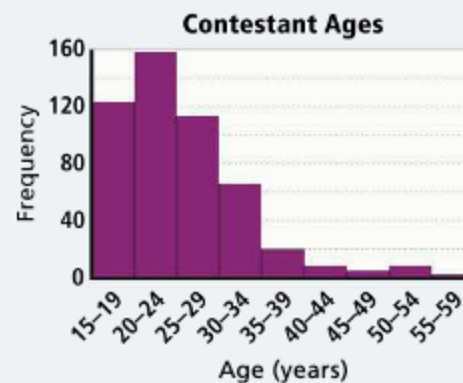
Part A Describe the shape of the data. How would you expect the mean and median to compare?

Part B Which graph would be better to convince students that they should continue singing lessons into 20s? Which graph would be better to convince students to continue lessons into their 30s?

34. Performance Task Outliers can be identified using the interquartile method. Multiply the interquartile range by 1.5. If a data value has a distance below the first quartile or above the third quartile greater than this product, it is an outlier. Another way is to use the z-score method. If a data value falls more than 3 standard deviations from the mean, the data value is an outlier. The table shows the high temperature for 14 days.

| 81°F | 78°F | 77°F | 75°F | 80°F | 81°F | 80°F |
| 77°F | 74°F | 75°F | 49°F | 71°F | 72°F | 80°F |

Part A Identify the mean, standard deviation, first quartile, third quartile, and interquartile range of the data.

Part B Which data values, if any, are outliers using the interquartile method? Explain your reasoning.

Part C Which data values, if any, are outliers using the z-score method? Explain your reasoning.

Spot Light on:

Alan Mathison Turing was an English mathematician, computer scientist, logician, cryptanalyst, philosopher, and theoretical biologist.[Turing was highly influential in the development of theoretical computer science, providing a formalisation of the concepts of algorithm and computation with the Turing machine, which can be considered a model of a general-purpose computer.

Mathematics Practices

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reason of others.
4. Model with mathematics.
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.

Social and Emotional Learning: *Competencies*	Social and Emotional Learning: *Sub-Competencies*
Self- awareness	Recognizing the importance of self-confidence in handling daily tasks and challenges.
Social Awareness	
Self- Management	Demonstrate an awareness of the expectations for social interactions in a variety of ways.
Relationship Skills	Demonstrate an understanding of the need for mutual respect when viewpoints differ.
Responsible Decision-Making	

	Recognize the skills needed to establish and achieve personal and educational goals. Utilize positive communication and social skills to interact effectively with others. Develop, implement, and model effective problem solving and critical thinking skills.	

Assessments (Formative) *To show evidence of meeting the standard/s, students will successfully engage within:*	Assessments (Summative) *To show evidence of meeting the standard/s, students will successfully complete:*
Formative Assessments: ● Entry and Exit Slips ● Quizzes ● Self Assessments	**Benchmarks:** ● Chapter Tests ● Projects **Summative Assessments:** ● District Assessments ● Midterms ● Standardized Tests

Differentiated Student Access to Content: Teaching and Learning *Resources/Materials*			
Core Resources	**Alternate Core Resources** ***IEP/504/At-Risk/ESL***	**ELL Core Resources**	**Gifted & Talented Core Resources**
● Textbooks websites ● Achieve the core ● Khan Academy ● Desmos	● Skill building worksheets ● Math Manipulatives	● Dictionary for native languages ● Videos in their native language.	● Leveled Assessments ● Enrichment worksheets

Supplemental Resources

Technology:
 ● **Chromebooks, Graphing Calculators, Online math manipulatives**
Other:
 ● **Zoom and Google Meets, Google Classroom, Interactive Textbooks**

Differentiated Student Access to Content: Recommended *Strategies & Techniques*			
Core Resources	**Alternate Core Resources** *IEP/504/At-Risk/ESL*	**ELL Core Resources**	**Gifted & Talented Core**
• **Deliver instruction utilizing varied learning styles including audio, visual, and tactile/kinesthetic, provide individual instruction as needed, modify assessments and/or rubrics, repeat**	• **Utilize a multi-sensory (VAKT) approach during instruction, provide alternate presentations of skills by varying the method (repetition, simple explanations, additional examples, modeling, etc.), modify test content and/or format, allow students to retake test for additional credit, provide additional times and preferential seating as needed, review, restate and repeat directions, provide study guides, and/or break assignments into segments of shorter tasks.**	• **Extend time requirements, preferred seating, positive reinforcement, check often for understanding/review, oral/visual directions/prompts when necessary, supplemental materials including use of an online bilingual dictionary, and modified assessment and/or rubric.**	• **Create an enhanced set of introductory activities, integrate active teaching/learning opportunities, incorporate authentic components, propose interest-based extension activities, and connect student to related**

	Disciplinary Concept: Creativity and Innovation	
NJSLS CAREER READINESS, LIFE LITERACIES & KEY SKILLS	*Core Ideas:*	Solutions to the problems faced by a global society require the contribution of individuals with different points of view and experiences.
	Performance Expectation/s:	9.4.12.GCA.1: Collaborate with individuals to analyze a variety of potential solutions to climate change effects and determine why some solutions (e.g., political. economic, cultural) may work better than others (e.g., SL.11-12.1.,

		HS-ETS1-1, HS-ETS1-2, HS-ETS1-4, 6.3.12.GeoGI.1, 7.1.IH.IPERS.6, 7.1.IL.IPERS.7, 8.2.12.ETW.3).
	Career Readiness, Life Literacies, & Key Skills Practices	
	Act as a responsible and contributing community member and employee. **Attend to financial well-being.** **Consider the environmental, social and economic impacts of decisions.** **Demonstrate creativity and innovation.** **Utilize critical thinking to make sense of problems and persevere in solving them.** **Model integrity, ethical leadership and effective management.** **Plan education and career paths aligned to personal goals.** **Use technology to enhance productivity, increase collaboration and communicate effectively.** **Work productively in teams while using cultural/global competence.**	

New Jersey Legislative Statutes and Administrative Code (place an "X" before each law/statute if/when present within the curriculum map)							
Amistad Law: *N.J.S.A. 18A 52:16A-88*		Holocaust Law: *N.J.S.A. 18A:35-28*	X	LGBT and Disabilities Law: *N.J.S.A. 18A:35-4.35*		Diversity & Inclusion: *N.J.S.A. 18A:35-4.36a*	Standards in Action: *Climate Change*