

# Unit 04: Interpreting Data and Statistics

Content Area: **Template**  
Course(s):  
Time Period: **Full Year**  
Length: **FY**  
Status: **Published**

## Standards Alignment

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### New Jersey Student Learning Standards

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#### Integration of Career Readiness, Life Literacies and Key Skills

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CRP.K-12.CRP1	Act as a responsible and contributing citizen and employee.
CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP3	Attend to personal health and financial well-being.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP5	Consider the environmental, social and economic impacts of decisions.
CRP.K-12.CRP6	Demonstrate creativity and innovation.
CRP.K-12.CRP7	Employ valid and reliable research strategies.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP9	Model integrity, ethical leadership and effective management.
CRP.K-12.CRP10	Plan education and career paths aligned to personal goals.
CRP.K-12.CRP11	Use technology to enhance productivity.
CRP.K-12.CRP12	Work productively in teams while using cultural global competence.

#### Technology / Integration of Computer Science and Design Thinking

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TECH.8.1.12	Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
TECH.8.1.12.D	Digital Citizenship: Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.
TECH.8.1.12.D.2	Evaluate consequences of unauthorized electronic access (e.g., hacking) and disclosure, and on dissemination of personal information.
TECH.8.1.12.D.5	Analyze the capabilities and limitations of current and emerging technology resources and assess their potential to address personal, social, lifelong learning, and career needs.
TECH.8.1.12.F	Critical thinking, problem solving, and decision making: Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed

	decisions using appropriate digital tools and resources.
TECH.8.1.12.F.1	Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs.
TECH.8.2.12	Technology Education, Engineering, Design, and Computational Thinking - Programming: All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.
TECH.8.2.12.E	Computational Thinking: Programming: Computational thinking builds and enhances problem solving, allowing students to move beyond using knowledge to creating knowledge.
TECH.8.2.12.E.1	Demonstrate an understanding of the problem-solving capacity of computers in our world.
TECH.8.2.12.E.4	Use appropriate terms in conversation (e.g., troubleshooting, peripherals, diagnostic software, GUI, abstraction, variables, data types and conditional statements).

## **Interdisciplinary Connections: NJSLS for ELA, Social Studies, Science and/or Math Section**

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### **Capacities of the Literate Individual**

#### **Students Who are College and Career Ready in Reading, Writing, Speaking, Listening, & Language**

They demonstrate independence.

They build strong content knowledge.

They respond to the varying demands of audience, task, purpose, and discipline.

They value evidence.

They use technology and digital media strategically and capably.

MATH.K-12.1	Make sense of problems and persevere in solving them
MA.S-ID	Interpreting Categorical and Quantitative Data
MA.S-ID.A	Summarize, represent, and interpret data on a single count or measurement variable
MA.S-ID.A.1	Represent data with plots on the real number line (dot plots, histograms, and box plots).
MATH.K-12.2	Reason abstractly and quantitatively
MA.S-ID.A.2	Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.
MA.S-ID.A.3	Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).
MA.S-ID.A.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.
MATH.K-12.4	Model with mathematics

MA.S-ID.B	Summarize, represent, and interpret data on two categorical and quantitative variables
MA.S-ID.B.5	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.
MATH.K-12.5	Use appropriate tools strategically
MA.S-ID.B.6	Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.
MATH.K-12.6	Attend to precision
MA.S-ID.B.6b	Informally assess the fit of a function by plotting and analyzing residuals, including with the use of technology.
MATH.K-12.7	Look for and make use of structure
MA.S-ID.B.6c	Fit a linear function for a scatter plot that suggests a linear association.
MA.S-ID.C	Interpret linear models
MATH.K-12.8	Look for and express regularity in repeated reasoning
MA.S-ID.C.7	Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.
MA.S-ID.C.9	Distinguish between correlation and causation.
LA.K-12.NJSLSA.SL	Speaking and Listening Comprehension and Collaboration
LA.K-12.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. Presentation of Knowledge and Ideas
LA.K-12.NJSLSA.SL4	Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.
LA.K-12.NJSLSA.SL6	Adapt speech to a variety of contexts and communicative tasks, demonstrating command of formal English when indicated or appropriate.
LA.K-12.NJSLSA.L	Language Conventions of Standard English
LA.K-12.NJSLSA.L1	Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
LA.K-12.NJSLSA.L2	Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.
LA.K-12.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.
LA.SL.9-10.1	Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with peers on grades 9–10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.
LA.SL.9-10.1.A	Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas.
LA.SL.9-10.1.B	Collaborate with peers to set rules for discussions (e.g., informal consensus, taking votes on key issues, presentation of alternate views); develop clear goals and assessment

	criteria (e.g., student developed rubric) and assign individual roles as needed.
LA.SL.9-10.1.C	Propel conversations by posing and responding to questions that relate the current discussion to broader themes or larger ideas; actively incorporate others into the discussion; and clarify, verify, or challenge ideas and conclusions.
LA.SL.9-10.1.D	Respond thoughtfully to various perspectives, summarize points of agreement and disagreement, and justify own views. Make new connections in light of the evidence and reasoning presented.
LA.SL.9-10.6	Adapt speech to a variety of contexts and tasks, demonstrating command of formal English.
LA.L.9-10.1	Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
LA.L.9-10.2	Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.
LA.L.9-10.2.C	Spell correctly.
LA.L.9-10.6	Acquire and use accurately 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 considering a word or phrase important to comprehension or expression.

## **Integration of Diversity, Equity and Inclusion; Climate Change; Informational and Media Literacy**

see Crosswalks

## **21st Century Life and Careers**

### **Stage I: Desired Results**

### **Transfer/Overview/Rationale**

#### **Transfer / Overview / Rationale**

##### Unit Rationale

The purpose of this unit...

Building on previously learned concepts, students will learn about sampling techniques that are used to gather data from real-world situations. If the data are representative of the larger population, useful inferences can be made about that population. The most appropriate data representation depends on the type of data - quantitative or qualitative. Line plots, box plots, and histograms are different ways to show distribution of data over a possible range of values.

## **Meaning**

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## **Essential Questions**

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How can collecting and analyzing data help you make decisions or predictions?

How can you make or interpret different representations of data?

How can you determine whether data is qualitative or quantitative?

## **Enduring Understanding/Indicators of Understanding**

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Different measures can be used to interpret and compare sets of data.

When collecting data, it is important for the results to accurately represent the situation.

Sets of numerical data are described using measures of central tendency.

Data can be used to make predictions or decisions about future events.

## **Acquisition (Student Learning Objectives)**

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## **Knowledge**

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### Knowledge

Students will know...

There are three measures of central tendency, mean, median, and mode.

Data can be displayed in scatter plots, box plots, and histograms.

Data that has been graphed and plotted can be interpreted to make inferences about a population.

Data can be classified as either qualitative or quantitative.

## **Skills**

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### Skills

Student will be skilled at ...

Determining mean, median and mode of a data set.

Displaying data in a scatter plot, box plot and histogram.

Interpret data in a scatter plot, box plot and histogram.

Classifying and identifying different types of data.

Collect and analyze real-world data to make decisions and predictions about their future.

## **Stage 3: Learning Plan**

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### **Resource and Mentor Texts**

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#### Resources and Mentor Texts

-Kuta Pre-Algebra and Algebra.

-Algebra 1 (Prentice Hall) Foundations Series.

-Pacemaker Algebra 1 (Pearson).

-Algebra Essentials (Merrill).

Blue Text(Pacemaker); pg. 217, 1-8, pg. 219, 1-12, pg. 221, 1-8, pg. 223, 1-4, pg. 225, 1-3, pg. 227, 1-2.

Green text(Merrill); pg. 478, 1-9, pg. 480, 1-13, pg. 483, 1-18, pg. 486, 1-20, pg. 489, 1-11, pg. 492, 9-20, pg. 495, 1-17,

Foundations Text; pg. 719, 1-12, pg. 727, 14-25, pg. 734, 8-16, pg. 741, 11-25.

### **Formative Assessment Strategies**

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## Formative Assessment Strategies

Attached individual skill worksheets with use of notes.

IXL data

Oral questioning and whiteboard activities

Performance on review game activities such as Math Bee and Post-It

Student proficiency on classwork and homework

Written solution statements

[Center and Spread of Data.pdf](#)

[Scatter Plots.pdf](#)

[Using Statistical Models.pdf](#)

[Visualizing Data.pdf](#)

## **Learning Activities/Unit of Study**

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Learning Activities/Unit of Study

-Students will define pertinent vocabulary for each section on flashcards or bound copybook.

-Powerpoint notes will be provided. Students will copy steps and procedures in copybook and a hard copy will be

provided if necessary.

-Example problems will be performed along with written steps and procedures. Students will write each example problem in their copybook.

-Students will be given practice problems to perform individually or in groups. Those problems will be performed on the board voluntarily by students.

-Practice problems will be given for students to perform individually and on their own either during class or for homework. These problems will also be performed on the board.

- Challenge problems Post It Notes game activity

-A Math Bee may be played where students need to perform taught content mentally in game form.

- Group work problems may be performed on individual White Boards in a given amount of time to be held up for given points.

-IXL lessons will be assigned according to content. These lessons may also be assigned as a re-test or extra credit on an assessment.

- Solution Statements in which students explain in writing what steps were performed in their solution, or, in a given solution, what steps, if any, were performed incorrectly.

## **Modifications and/or Accommodations**

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### **Suggested Modifications (ELL, Sp. Ed, Gifted, At-risk of Failure)**

#### **English Language Learners**

Native language support: The teacher provides auditory or written content to students in their native language.

**Adjusted Speech:** The teacher changes speech patterns to increase student comprehension. This could include facing the students, paraphrasing, clearly indicating the most important ideas, and speaking more slowly.

**Visuals:** The teacher uses graphics, pictures, visuals, and manipulatives. This helps ELL students better understand and comprehend the subjects at hand.

**Front-Loading Vocabulary:** The teacher front loads vocabulary. This means providing students with a list of important vocabulary words they will need to know for a book, lesson, etc. prior to the lesson being taught. Including pictures to go with the vocabulary words is also very beneficial for the students.

## Special Education Students

**Chunking:** The teacher presents information in a way that makes it easy for students to understand and remember. Chunking is based on the presumption that our working memory is easily overloaded by excessive detail. The best way to deliver information is to organize it into meaningful units. Because students with special needs get overloaded easily, chunking is an effective strategy to use with them.

**Checking for Understanding:** It is important to constantly check for understanding, especially for students who have accommodations. Teachers want to make sure students understand the concepts being covered in a way that makes sense to them.

**Extra time:** The teacher provides students with special needs extra time to complete work or answer questions. It is important to give students enough time to process their thoughts.

**Oral Reading:** The teacher will read work orally to students. Class work such as tests and literature circles may need to be read aloud to the student.

**Timers:** The teacher will use timers as an instructional tool. The use of timers is beneficial for students who have trouble completing tasks. Timers can be helpful so the student is aware of how much time they have to complete an assignment.

## Students with 504 Plans

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## Gifted & Talented Strategies

**Extensions/Enrichments:** Teachers will provide gifted and talented students with extension/enrichment projects. Students will be challenged to further their understanding, to apply acquired knowledge, and/or to produce something in reference to acquired knowledge.

**Modify/Change Activities:** Teachers will monitor and modify activities to accommodate those students who need to be challenged further. Additional reading, problem-solving, writing, or project work is necessary for those students who are ready to move on at a rate more accelerated than their peers. In this way, G & T students are provided the same opportunity for support as special needs students.

## Students at Risk of School Failure

**Directions or Instructions:** Make sure directions and/or instructions are given in limited numbers. Give directions/instructions verbally and in simple written format. Ask students to repeat the instructions or directions to ensure understanding occurs. Check back with the student to ensure he/she hasn't forgotten.

**Peer Support:** Peers can help build confidence in other students by assisting in peer learning. Many teachers use the 'ask 3 before me' approach. This is fine, however, a student at risk may have to have a specific student or two to ask. Set this up for the student so he/she knows who to ask for clarification before going to you.

**Alternate or Modified Assignments:** Always ask yourself, "How can I modify this assignment to ensure the students at risk are able to complete it?" Sometimes you'll simplify the task, reduce the length of the assignment or allow for a different mode of delivery. For instance, many students may hand something in, the at-risk student may jot notes and give you the information verbally. Or, it just may be that you will need to assign an alternate assignment.

**Increase One to One Time:** When other students are working, always touch base with your students at risk and find out if they're on track or needing some additional support. A few minutes here and there will go a long way to intervene as the need presents itself.

**Contracts:** It helps to have a working contract between you and your students at risk. This helps prioritize the tasks that need to be done and ensure completion happens. Each day write down what needs to be completed, as the tasks are done, provide a checkmark or happy face. The goal of using contracts is to eventually have the student come to you for completion sign-offs.

**Hands On:** As much as possible, think in concrete terms and provide hands-on tasks. This means a child doing math may require a calculator or counters. The child may need to tape record comprehension activities instead of writing them. A child may have to listen to a story being read instead of reading it him/herself.

**Tests/Assessments:** Tests can be done orally if need be. Break tests down in smaller increments by having a portion of the test in the morning, another portion after lunch and the final part the next day.

**Seating:** Seat students near a helping peer or with quick access to the teacher. Those with hearing

or sight issues need to be close to the instruction which often means near the front.