

Course: SAT Prep MATH Unit #: Unit 1 - Problem Solving and Data Analysis	Year of Implementation: 2023-2024
Curriculum Team Members Michael Spera mspera@lrhsd.org	
Stage One - Desired Results	
Link(s) to New Jersey Student Learning Standards for this course: <i>{provide all applicable links to standards here}</i> https://www.state.nj.us/education/cccs/2020/	
● Unit Standards: <i>(keep each of the following headings in place)</i> ○ Content Standards ■ NJSLS N.Q. 1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays ■ NJSLS S.ID.A. Summarize, represent, and interpret data on a single count or measurement variable ■ NJSLS 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 ■ NJSLS S.ID.B.6. Fit a function to the data (including with the use of technology); use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear and exponential models. ■ NJSLS S.IC.A Understand and evaluate random processes underlying statistical experiments ■ NJSLS S.IC.B. Make inferences and justify conclusions from sample surveys, experiments, and observational studies ○ 21st Century Life & Career Standards ■ 9.4.5.CT.1-4 The ability to solve problems effectively begins with gathering data, seeking resources, and applying critical thinking skills. ■ 9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas	

<https://www.state.nj.us/education/cccs/2020/2020%20NJSL-CLKS.pdf>

○ **English Companion Standards**

- RST.11-12.1. Accurately cite strong and thorough evidence from the text to support analysis of science and technical texts, attending to precise details for explanations or descriptions.
- RST.11-12.3. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
- RH.11-12.7. Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, qualitatively, as well as in words) in order to address a question or solve a problem.

https://www.nj.gov/education/standards/ela/Docs/2016NJSL-ELA_Companion11-12.pdf

- **NJ Statutes:** NJ State law mandates the inclusion of the following topics in lesson design and instruction as aligned to elementary and secondary curriculum.

Amistad Law: N.J.S.A. 18A 52:16A-88 Every board of education shall incorporate the information regarding the contributions of African-Americans to our country in an appropriate place in the curriculum of elementary and secondary school students.

Holocaust Law: N.J.S.A. 18A:35-28 Every board of education shall include instruction on the Holocaust and genocides in an appropriate place in the curriculum of all elementary and secondary school pupils. The instruction shall further emphasize the personal responsibility that each citizen bears to fight racism and hatred whenever and wherever it happens.

LGBT and Disabilities Law: N.J.S.A. 18A:35-4.35 A board of education shall include instruction on the political, economic, and social contributions of persons with disabilities and lesbian, gay, bisexual, and transgender people, in an appropriate place in the curriculum of middle school and high school students as part of the district's implementation of the New Jersey Student Learning Standards (N.J.S.A. 18A:35-4.36) A board of education shall have policies and procedures in place pertaining to the selection of instructional materials to implement the requirements of N.J.S.A. 18A:35-4.35.

Diversity and Inclusion ([N.J.S.A. 18A:35-4.36a](#)) A board of education shall incorporate instruction on diversity and inclusion in an appropriate place in the curriculum of students in grades kindergarten through 12 as part of the district's implementation of the New Jersey Student Learning Standards.

Asian American and Pacific Islanders (AAPI) ([P.L.2021, c.410](#)) Ensures that the contributions, history, and heritage of Asian Americans and Pacific Islanders (AAPI) are included in the New Jersey Student Learning Standards (NJSLS) for Social Studies in kindergarten through Grade 12 (P.L.2021, c.416)

For additional information, see

NJ Amistad Curriculum: <http://www.njamistadcurriculum.net/>

Diversity and Inclusion: <https://www.nj.gov/education/standards/dei/index.shtml>

- (Sample Activities/ Lessons): <https://www.nj.gov/education/standards/dei/samples/index.shtml>

Asian American and Pacific Islanders:

- [Asian American and Pacific Islander Heritage and History in the U.S.](#)

A Teacher's Guide from EDSITEment offering a collection of lessons and resources for K-12 social studies, literature and arts classrooms that center around the experiences, achievements and perspectives of Asian Americans and Pacific Islanders across U.S. history.

Transfer Goal: Students will be able to independently use their learning to be quantitatively literate and demonstrate a command of the math that resonates throughout college courses, career training programs, and everyday life.

As aligned with LRHSD Long Term Learning Goal(s):

1. *Problem-Solving: apply and transfer autonomously and collaboratively mathematical concepts and problem-solving techniques to unfamiliar, varied and real-world situations*
2. *Reasoning: reason abstractly and quantitatively by applying mathematical representations, symbols and estimation techniques when engaging in problem-solving*
3. *Critical Thinking: construct and effectively communicate valid conclusions and critique the reasoning of others*
4. *Modeling: demonstrate mastery of concepts by evaluating models that others have constructed or by creating appropriate models of their own*
5. *Tools: identify the correct tools to solve problems, if applicable*
6. *Precision: determine an answer's appropriateness as a means of determining its validity, while using proper mathematical notation and units*
7. *Structure: use multiple representations, critical thinking skills, and prior knowledge to solve problems in new situations*
8. *Patterns: analyze data and recognize patterns in a variety of situations*
9. *Habits of Mind: approach new situations with curiosity, persistence, resourcefulness, and confidence; take risks, monitor their progress, accept and learn from setbacks, make adjustments, and reflect on their performance*

Enduring Understandings

Students will understand that. . .

EU 1

creating and analyzing relationships using ratios, proportions, percentages, and units can lead to a more complete understanding of the data that is being described.

Essential Questions

EU 1

- What insights can be gained when you analyze data using proportions, percentages and units?

<i>EU 2</i> describing relationships that are shown graphically can lead to a deeper understanding of the data. <i>EU 3</i> summarizing qualitative and quantitative data can help to describe relationships for decision making.	<i>EU 2</i> • What understandings can be gained when data relationships are shown graphically? <i>EU 3</i> • What factors will go into decision making when a summarization of Qualitative and/or Quantitative data is completed?
<u>Knowledge</u> Students will know . . . <i>EU 1</i> • a proportional relationship between two variables can solve a multistep problem. (NJSLS N.Q. 1) • solving a multistep problem can determine a percentage and calculate a unit rate. (NJSLS N.Q. 1) <i>EU 2</i> • an interpretation of data graphically can lead to a prediction model of the data analyzed (NJSLS S.ID.A.1) • the type of model that best fits data can be used to determine a real world connection between variables. (NJSLS S.ID.B.6.)	<u>Skills</u> Students will be able to. . . <i>EU 1</i> • use ratios, rates, proportional relationships, and scale drawings to solve single- and multi-step problems. (NJSLS N.Q. 1) • solve single- and multi-step problems involving percentages, measurement quantities, units, and unit conversion. (NJSLS N.Q. 1) <i>EU 2</i> • use scatterplot, linear, quadratic, or exponential models to describe how the variables are related. (NJSLS S.ID.A.1) • use the relationship between 2 variables to investigate key features of the graph. (NJSLS S.ID.B.6.)

<i>EU 3</i> • data sets can be analyzed for mean, median, mode, range and/or standard deviation. (NJSLS S.ID.A.1-4) • that reports may come in the form of tables, graphs and text summaries from which inferences and conclusions can be determined. (NJSLS S.IC.A.1 and NJSLS S.IC.B)	• compare linear growth with exponential growth. (NJSLS S.ID.B.6.) <i>EU 3</i> • use statistics to investigate measures of center of data (analyze shape, center, and spread). (NJSLS S.ID.A.1-4) • evaluate reports to make inferences, justify conclusions, and determine appropriateness of data collection methods. The reports may consist of tables, graphs, or text summaries. (NJSLS S.IC.A.1 and NJSLS S.IC.B)
Stage Two - Assessment	
<u>Other Evidence:</u> • Dialogue on test taking strategies and permissible use of a calculator. • Explore College Board resources including Khan Academy • Small quizzes in SAT format to include both multiple choice and open ended questions. Grid responses. Suggested to be homework as class time is limited.	

- Practice SAT Test format to include both multiple choice and open ended questions. Grid responses.
- Online practice tests
- Practice scoring an SAT test
- Reflect on performance and form improvement plan

Stage Three - Instruction

Learning Plan: Suggested Learning Activities to Include Differentiated Instruction and Interdisciplinary Connections: Each learning activity listed must be accompanied by a learning goal of A= Acquiring basic knowledge and skills, M= Making meaning and/or a T= Transfer. {place A, M and/or T along with the applicable EU number in parentheses after each statement} All knowledge and skills must be addressed in this section with a corresponding lesson/activity which teaches each concept. The following color codes are used to notate activities that correspond with interdisciplinary connections and 21st Century Life & Career Connections (which involves Technology Literacy): *Red = Interdisciplinary Connection; Purple = 21st Century Life & Career Connection*

- Use ratios, rates, proportional relationships and scale drawings to solve single and multistep problems (A, EU1)
- Solve single and multi-step problems involving percentages (A, EU1)
- Solve single and multi-step problems involving measurement quantities, units and unit conversions (A, EU1)
- Use a scatterplot and linear, quadratic or exponential models to describe how the variables are related. (M,T, EU2)
- Use the relationship between two variables to investigate key features of the graph. (M,EU2)
- Compare linear growth with exponential growth. (M, T, EU2)
- Use two-way tables to summarize categorical data and relative frequencies, and calculate conditional probability. (M,T, EU3)
- Make inferences about population parameters based on sample data. (M, EU3)
- Use statistics to investigate measures of center of data and analyze shape, center and spread. (M, T, EU3)
- Evaluate reports to make inferences, justify conclusions and determine appropriateness of data collection methods. (M,T, EU3)
- SAT Resources via College Board and Khan Academy

--

Pacing Guide		
<i>Unit #</i>	<i>Title of Unit</i>	<i>Approximate # of teaching days</i>
1	Problem Solving and Data Analysis	12
2	Heart of Algebra	9
3	Passport to Advanced Math and Additional Topics	11

Instructional Materials
• https://www.khanacademy.org/sat • https://satsuite.collegeboard.org/sat/practice-preparation/practice-tests • Text: CollegeBoard's <u>The Official SAT Study Guide</u>

Accommodations

Special Education: The curriculum will be modified as per the Individualized Education Plan (IEP). Students will be accommodated based on specific accommodations listed in the IEP.

Students with 504 Plans: Students will be accommodated based on specific accommodations listed in the 504 Plan.

English Language Learners: Students will be accommodated based on individual need and in consultation with the ELL teacher.

Students at Risk of School Failure: Students will be accommodated based on individual need and provided various structural supports through their school.

Gifted and Talented Students: Students will be challenged to enhance their knowledge and skills through acceleration and additional independent research on the subject matter.