TOWNSHIP OF UNION PUBLIC SCHOOLS

College Study Skills (Mathematics Portion)
Adopted June 17, 2015
Updated December 18, 2018

District Mission Statement

The Township of Union Board of Education believes that every child is entitled to an education, designed to meet his or her individual needs, in an environment that is conducive to learning. State standards, federal and state mandates, and local goals and objectives, along with community input, must be reviewed and evaluated on a regular basis to ensure that an atmosphere of learning is both encouraged and implemented. Furthermore, any disruption to or interference with a healthy and safe educational environment must be addressed, corrected, or, when necessary, removed, in order for the district to maintain the appropriate educational setting.

District Philosophy Statement

The Township of Union Public School District, as a societal agency, reflects democratic ideals and concepts through its educational practices. It is the belief of the Board of Education that a primary function of the Township of Union Public School System is the formulation of a learning climate conducive to the needs of all students in general, providing therein for individual differences. The school operates as a partner with the home and community.

Course Description

This course is test preparation for the mathematics section of the SAT test, used as an admissions requirement by some colleges and universities. The class content has been designed for students wishing to eventually attend a four-year post-secondary institution. Students should ideally come into the class having had completed algebra 1 and geometry with a C or better, and currently enrolled in algebra 2 or higher. While numerical, algebraic, geometric, functional analysis and statistical concepts will be highlighted and reviewed, the student is expected to have a certain level of mastery in order to be able to apply this knowledge to the answering of SAT type questions. The course's primary focus is to develop techniques and confidence in reading, interpreting, modeling, answering and checking reasonability of answers to SAT type questions. Real questions from past SAT examinations will be completed and analyzed. By the end of the school year it is hoped that the student's ability to recognize and solve the most frequently asked questions will enhance both accuracy and speed.

Recommended Textbooks

**The Official SAT Study Guide by THE College Board, New York
SAT questions from the College Board website**

Curriculum Units:
Unit 1: Numbers & Operations
Unit 2: Algebra & Functions
Unit 3: Geometry
Unit 4: Data Analysis, Statistics & Probability
Unit 5: Test Strategies

Pacing Guide

Unit 1: Numbers & Operations……20 days
Unit 2: Algebra & Functions…….20 days
Unit 3: Geometry…………….20 days
Unit 4: Data Analysis, Statistics & Probability…….20 days
Unit 5: Test Strategies…..10 days

Unit 1 (Numbers & Operations)

NJSLS	NJSLS Content	Learning Activities
N-RN	Extend the properties of exponents to rational exponents	Homework review Direct instruction (board notes/presentations) Guided and independent practice Investigation activities Flipped classroom
N-Q	Reason quantitatively and use units to solve problems	

Unit 1 Proficiencies

Students will be able to:
- Find LCM and GCF
- Identify the results of operations on even, odd, positive and negative numbers
- Utilize properties of additive and multiplicative inverses
- Find consecutive integers and consecutive multiples totaling to a given number
- Put all types of real numbers in numerical order
- Solve direct and inverse variations, involving changing of units

Suggested Differentiation for Unit 1

- **Tier 1 Learners:**
  - Have guided notes filled out at different levels according to ability.
  - Give assignments that contain tasks of varying difficulty. Each task should focus on essential learning that all students should master, but the tasks will vary in difficulty.
  - Group students by similar interest when working on application problems.
  - Use mini lessons to reteach to those having difficulty.
  - Group students so that each group contains all level learners. The tier 3 learners can serve as peer helpers.
  - Assign a basic homework assignment. Require students to spend a set amount of time to work (showing effort) on the assignment rather than completing the entire assignment.
  - Allow students to choose a method for completing a project: video, PowerPoint, paper, or presentation.
- **Tier 2 Learners:**
  - Utilize foldables creating tangible products to help students digest information while incorporating several of the multiple intelligences.
- **Tier 3 Learners:**
  - Have problems posted around the room. Have students loop to specific questions based on difficulty.

Curriculum Resources

- Textbook - The Official SAT Study Guide
- Internet based resources - videos, interactive manipulative, online tutors

  - Khan Academy
  - Virtual Nerd
  - BuzzMath
  - Kuta Software
  - YouTube

Formative Assessments	Summative Assessments

Homework
Classroom whiteboard problem solving
Exit tickets
Review Games
Teacher Observations
Use of technology (Google Suite)
Do nows
Oral questioning
Short constructed responses

Quiz
Chapter Test
Projects

- Solve equations with rational exponents
- Find a number given a set of specifications
- Identify patterns
- Solve problems with a given remainder

Interdisciplinary Connections: Instructional connections through working with authentic scenarios, teachers should help students see how expressions can represent situations in life and will reflect their specific grade-level coursework in other content areas, such as English language arts, reading, science, social studies, world languages, physical education, and fine arts, among others.

Unit 2 (Algebra & Functions)

NJSLS	NJSLS Content	Learning Activities
FIF 8a	Use the process of factoring to show zeros, line of symmetry, and vertex of a parabola	Homework review
A-REI 3	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters	Direct instruction (board notes/presentations)
A-REI 6	Solve system of linear equations exactly and approximately (with graphs)	Guided and independent practice
F-IF 2	Use function notation, evaluate function with inputs, and interpret statements that use function notation	Investigation activities
FBF 3	Identify the effects on graphs by replacing values	Flipped classroom

Major Content **Supporting Content** **Additional Content**

Unit 2 Proficiencies
Students will be able to: - Use factoring to solve a quadratic equation   - Solve for one variable in terms of another   - Solve systems of equations   - Identify transformations of a graph   - Identify the parts of an exponential equation   - Utilize function notation

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  - Group students by similar interest when working on application problems.
  - Use mini lessons to reteach to those having difficulty.
  - Group students so that each group contains all level learners. The tier 3 learners can serve as peer helpers.
  - Assign a basic homework assignment. Require students to spend a set amount of time to work (showing effort) on the assignment rather than completing the entire assignment.
  - Allow students to choose a method for completing a project: video, PowerPoint, paper, or presentation.
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Formative Assessments	**Summative Assessments**
Homework Classroom whiteboard problem solving Exit tickets Review Games Teacher Observations Use of technology (Google Suite) Do nows Oral questioning Short constructed responses	Quiz Chapter Test Projects - Use calculators as appropriate to analyze graphs - Use equations to solve distance, average, and percent of increase problems - Create a system of equations from a word problem involving 2 unknowns - Find the missing value in an exponential model - Connect parts of graphs with appropriate slopes

Interdisciplinary Connections/Technology

Interdisciplinary Connections: see desmos…https://teacher.desmos.com/functions

Unit 3 (Geometry)

NJSLS	NJSLS Content	Learning Activities
G-SRT 8	Use trig ratios and Pythagorean Theorem	Homework review
G-C5	Find arc lengths and area of sectors	
G-GMD	Explain volume formulas and use them to solve problems	Direct instruction (board notes/presentations)
G-CO 9	Prove theorems about lines and angles	
	Prove theorems about parallelograms	Guided and independent practice
GCO 11		Investigation activities
		Flipped classroom

Major Content Supporting Content Additional Content

Unit 3 Proficiencies

Students will be able to:
- Find the missing side of a triangle exactly or within a range by Pythagorean theorem, triples or third side theorem
- Make proportional comparisons between arc length to circumference, area of sector to area and central angle to 360 degrees
- Use volume, area, and perimeter formulas
- Use sum of interior angles of a polygon
- Recognize when congruent sides lead to congruent angles and vise versa
- Use properties of parallelograms and transversals

Suggested Differentiation for Unit 3

- **Tier 1 Learners:**
  - Have guided notes filled out at different levels according to ability.
  - Give assignments that contain tasks of varying difficulty. Each task should focus on essential learning that all students should master, but the tasks will vary in difficulty.
  - Group students by similar interest when working on application problems.
  - Use mini lessons to reteach to those having difficulty.
  - Group students so that each group contains all level learners. The tier 3 learners can serve as peer helpers.
  - Assign a basic homework assignment. Require students to spend a set amount of time to work (showing effort) on the assignment rather than completing the entire assignment.
  - Allow students to choose a method for completing a project: video, PowerPoint, paper, or presentation.
- **Tier 2 Learners:**
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Quiz
Chapter Test
Projects

- Demo how putting a problem on a coordinate plane could help find measurements
- Derive the formula for area of a sector
- Demo difference between surface area and volume
- Demo how the segment joining midpoints in a triangle is parallel to the third side and half its length
- Demo the right angle formed by a radius and tangent
- Discuss relationship between diagonal and diameter in circumscribed figures

Interdisciplinary Connections/Technology

Media Literacy: Students will examine the use of various forms of Geometry throughout architecture. Anticipated questions include – why was a particular form used? Was the decision structurally relevant? Culturally relevant? Students will examine and compare structures throughout the world considering both historic and modern constructions.

Global Perspective: Students will compare the architectural structures of significant buildings throughout the world. Are the chosen structures significant to that particular culture? Sample topics include Chinese/Asian architecture as compared to Greek or Roman architecture. Other samples include a comparison of cathedral architecture throughout history. The students research the work of Wassily Kandinsky, a Russian painter and art theorist. He analyzed the geometrical elements that make up every painting - the point and the line.

Unit 4 (Data Analysis, Statistics, & Probability)

NJSLS	NJSLS Content	Learning Activities
SID 1	Represent data with plots	Homework review
SID 2	Use appropriate statistics	
S-CP 9	Use permutations and combinations to complete problems	Direct instruction (board notes/presentations)
	Understand conditional problems	
		Guided and independent practice
S-CP 3		Investigation activities
		Flipped classroom

Major Content **Supporting Content** **Additional Content**

Unit 4 Proficiencies

Students will be able to:
- Read circle, bar, line and pictographs
- Find mean, mode, median
- Identify combinations and permutations
- Find probability of independent and dependent events
- Compute geometric probability on circles and rectangles
- Use Venn diagrams to demo intersections and unions

Suggested Differentiation for Unit 4

- **Tier 1 Learners:**
  - Have guided notes filled out at different levels according to ability.
  - Give assignments that contain tasks of varying difficulty. Each task should focus on essential learning that all students should master, but the tasks will vary in difficulty.
  - Group students by similar interest when working on application problems.
  - Use mini lessons to reteach to those having difficulty.
  - Group students so that each group contains all level learners. The tier 3 learners can serve as peer helpers.
  - Assign a basic homework assignment. Require students to spend a set amount of time to work (showing effort) on the assignment rather than completing the entire assignment.
  - Allow students to choose a method for completing a project: video, PowerPoint, paper, or presentation.
- **Tier 2 Learners:**
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Formative Assessments	Summative Assessments
Homework Classroom whiteboard problem solving Exit tickets Review Games Teacher Observations Use of technology (Google Suite) Do nows Oral questioning Short constructed responses	Quiz Chapter Test Projects Find largest percent of change in a graph, whether higher or lower Determine the affect on measures of central tendency given data changes Recognize when a list is better than a formula Recognize when fractional probabilities are given they must total to 1

Interdisciplinary Connections/Technology

Interdisciplinary Connections: Science: Develop a scatter plot for an experiment (for example, the relationship between temperature and pressure for a given volume). Identify the trend line and determine if the relationship is linear.

Media Literacy: Voter polls are much more accurate than they used to be. The science of random selection poll participants began after a poll conducted in 1936 inaccurately predicted who would win the Presidential election. Find a news article that uses poll data as a source of information. Research the polling company and the methods used and describe why random selection polling is an accurate way of making predictions.

Unit 5 (Test Strategies)

#	STUDENT LEARNING OBJECTIVES
1	Recognize how to plug in the correct numbers into an expression with a newly defined symbol
2	Locate and remember to use the formula page
3	Understand the difference between scoring a multiple choice and open-ended
4	Utilize technique of plugging in real numbers to find the correct answer to a variable problem
5	Recognize when the multiple choice answers will aid in finding the solution
6	Recognize when a problem can be solved backwards

Additional Suggested Modifications for Units

Below is an additional list of modifications and accommodations opportunities. This includes, but is not limited to,:

1. English Language Learners.
   a. Read written instructions.
   b. Model and provide examples
   c. Extended time on assessments when needed.
   d. Establish a non-verbal cue to redirect student when not on task.
   e. Students may use a bilingual dictionary.

English Language Development Standard 3: Language of Mathematics: English language learners communicate information, ideas and concepts necessary for academic success in the content area of mathematics.

2. Special Education/504 Students.
   a. Extended time on assessments when needed.
   b. Preferred seating to be determined by student and teacher.
   c. Provide modified assessments when necessary.
   d. Student may complete assessments in alternate setting when requested.
   e. Establish a non-verbal cue to redirect student when not on task.
   f. Maintain strong teacher / parent communication.
   g. Conversion chart

New Jersey Student Learning Standards - Technology

8.1 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.

A. Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and

operations

B. Creativity and Innovation: Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.

C. Communication and Collaboration: Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning.

E: Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information.

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.

*See Guide for Technology Integration.

Career Readiness Practices

- CRP1. Act as a responsible and contributing citizen and employee.
- CRP2. Apply appropriate academic and technical skills.
- CRP4. Communicate clearly and effectively and with reason.
- CRP6. Demonstrate creativity and innovation.
- CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
- CRP11. Use technology to enhance productivity.