Cliffside Park Public Schools

COURSE OF STUDY UNIT PLANNING GUIDE FOR:

Algebra 2 Unit 4

Grade Level:
11th

Cliffside Park School District
Cliffside Park, NJ 07010
www.cliffsidepark.edu

Course Overview:

The Algebra 2 course explores families of functions which include linear, quadratic, exponential, logarithmic, radical and rational. The course examines these functions in various forms including algebraically and graphically. Students explore key concepts involving operations on these types of functions and different graphical representation using both technology and sketches by hand. Trigonometric functions are also explored and investigated using r models and the unit circle. Probability, data analysis, and statistics are also explored to create inferences and justify conclusions.

Overview of Units:

1. Linear Function and Quadratic Functions
2. Polynomial Functions
3. Rational Exponents, Rational Functions & Exponential Growth and Decay Functions
4. Periodic Models, Making Inference, Justifying Conclusion and Conditional Probability

Mathematics: Algebra 2

Unit 3 Algebra 2				
Unit Name: Periodic Models, Making Inference, Justifying Conclusion and Conditional Probability **Primary Resource: Big Ideas Algebra 2 Common Core Edition 2016 and Associated Online Resources;** **Duration: Approximately 8 weeks**				
WEEK 31 **Essential Question: How can you find a trigonometric function of an acute angle θ?**				
NJSLS Standards	**Concepts** *What student will know.*	**Skills** *What students will be able to do.*	**Activities**	**Assessments and Checks for Understanding**
F.TF.A.1 - Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle **F.TF.A.2 -** Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle. **F.TF.B.5 -** Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.	***Lesson Vocabulary*:** Sine, cosine, tangent, cosecant, secant, cotangent ***Learning Goals*:** 89. To evaluate trigonometric functions of acute angles. 90. To find unknown side lengths and angle measurements of right triangles.	• Use and apply vocabulary terms in context. • To draw angles in standard position • To find find coterminal angles • To convert between degrees and radians • To use radian measure to solve real-life problems.	• Explorations 1 and 2 p 461 Trigonometric functions of special angles and Exploring Trig Identities • Introduce vocabulary • Core Concept p. 462, 463 • Assignment guide p 466 TE	***Formative:*** Analyzing Student classwork Strategic Questioning Error Analysis, p 466 Think Alouds Think-pair -Share Monitoring Progress questions 5-82 p.466 Exit Slips Do Nows Leveled Homework p. 466 TE Mini assessments p. 468 TE Quizzes ***Summative:*** Topic Tests Projects

F.TF.C.8 -Prove the Pythagorean identity *sin2(θ) + cos2(θ) = 1* and use it to find *sin(θ), cos(θ)*,or *tan(θ)* given *sin(θ), cos(θ)*, or *tan(θ)* and the quadrant of the angle. **MP.1** Make sense of problems and persevere in solving them. **MP.2** Reason abstractly and quantitatively. **MP.3** Construct viable arguments & critique the reasoning of others. **MP.4** Model with mathematics **MP.5** Use appropriate tools strategically. **MP.6** Attend to precision. **MP.7** Look for and make use of structure. **MP.8** Look for and express regularity in repeated reasoning.	91. To use trigonometric functions to solve real-life problems.			***Benchmark Tests:*** Approximately every 5-6 weeks. **Alternative:** Use dynamic assessment and investigations on online platform. Mini assessments on specific concpets Questioning Journal responses Illustrations, computer projects, oral response, creative presentations or demonstration, etc Performance Assessment Tasks
Interdisciplinary Connections and Activities:				

NJSLS-ELA

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.

RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.

RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

RST.11-12.10 By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.

W.11-12.1 Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.

W.11-12.2.D Use precise language, domain-specific vocabulary, and techniques such as metaphor, simile, and analogy to manage the complexity of the topic.

NJSLS-Technology

Students will participate in activities on Google Classroom and other online resources, Desmos. GeoGebra, IXL

8.1.12.A.3 Collaborate in online courses, learning communities, social networks or virtual worlds to discuss a resolution to a problem or issue.

Career Ready Practices:

Students will use Desmos, GeoGebra or the TI-84 calculator to assist in graphing and analyzing these equations. They will discuss their findings with the instructor and their classmates.

CRP2. Apply appropriate academic and technical skills.
CRP4. Communicate clearly and effectively and with reason
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
CRP11. Use technology to enhance productivity

Modifications *For ELL/IEPs/504s/At-Risk Learners:*
Resources by Chapter:
- Practice A and Practice B
- Puzzle Time

Student Journal: Practice
Differentiating the Lesson:
- Small group
- Diagrams and illustrations
- Partially completed examples with essential terms highlighted or underlined

Skills remediation: IXL
Khan Academy in Spanish

Modifications for Gifted And Talented

Advanced Questioning
Enrichment and Extension
Online resources
Start the Next Section
Differentiation

Possible Additional Resources:
www.desmos.com
www.GeoGebra.com

Illustrative Mathematics F.TF.A.1 Bicycle Wheel, F.TF.A.2 What exactly is a radian? , F.TF.A.2 Trigonometric functions for arbitrary angles (radians)
F.TF.A.2 Trig Functions and the Unit Circle

Khan Academy trigonometry

NJCTL Resources Trigonometry

WEEK 32 - WEEK 33

Essential Question: How can you find the measure of an angle in radian?
How can you use the unit circle to define the trigonometric function of any angle?

NJSLS Standards	**Concepts** *What student will know.*	**Skills** *What students will be able to do.*	**Activities**	**Assessments and Checks for Understanding**
F.TF.A.1 - Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle **F.TF.A.2 -** Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle. **MP.1** Make sense of problems and persevere in solving them. **MP.2** Reason abstractly and quantitatively. **MP.3** Construct viable	***Lesson Vocabulary:*** Initial side, terminal side, standard position, coterminal, radian, sector, central angle, unit circle, quadrantal angle, reference angle ***Learning Goals:*** 92. To draw angles in standard position. 93. To find coterminal angles. 94. To use radian Measure. 95. To evaluate trigonometric functions	• Use and apply vocabulary terms in context. Graph radical functions • Write transformations of radical functions • Graph parabolas and circles • Find trigonometric functions of any angle • Evaluate trigonometric functions given a point. • Use the unit circle	• Introduce core Vocabulary thru Fact-First Questionsing p. 471 TE • Exploration 1, Writing Radian Measures of Angles and 2, Writing Degree Measures of angles on p. 469 • Exploration 1 Writing Trig Functions p. 477 • Discuss vocabulary • Core Concepts on pp. 470, 471, 472, 479, and 480 • Progress problems by ability p. 474 and p. 482 TE	***Formative:*** Analyzing Student classwork Strategic Questioning Student discussion Error Analysis, p. 475, 482 Monitor Progress questions: pp. 470-473, 479-481. Exit Slips Do Nows Graphic Organizers Homework Quizzes Mini Assessment p. 476, 484 TE Leveled Homework p. 474, 482 ***Summative:***

arguments & critique the reasoning of others. **MP.4** Model with mathematics **MP.5** Use appropriate tools strategically. **MP.6** Attend to precision. **MP.7** Look for and make use of structure. **MP.8** Look for and express regularity in repeated reasoning.	given a point. 96. To use the Unit Circle to solve problems.	• Find and use reference angles		Topic Tests Projects **Benchmark Assessments:** Every 5-6 weeks. **Alternative:** Use index cards to assess students on angels Have students Fill in degree or radian measure sin a circle diagram like the one on page p. 472 and Core Concept on bottom of p. 480 on Evaluating Trigonometric functions Use dynamic assessment and investigations on online platform. Questioning Journal responses Illustrations, computer projects, oral response, creative presentations or demonstration, etc Performance Assessment Tasks

Interdisciplinary Connections and Activities:
NJSLS-ELA

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.

RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.

RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

RST.11-12.10 By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.

W.11-12.1 Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.

W.11-12.2.D Use precise language, domain-specific vocabulary, and techniques such as metaphor, simile, and analogy to manage the complexity of the topic.

NJSLS-Technology:

Students will participate in activities on Google Classroom and other online resources, Desmos. GeoGebra, IXL

8.1.12.A.3 Collaborate in online courses, learning communities, social networks or virtual worlds to discuss a resolution to a problem or issue.

Career Ready Practices:

Students will use Desmos, GeoGebra or the TI-84 calculator to assist in graphing and analyzing these equations. They will discuss their findings with the instructor and their classmates.

CRP2. apply appropriate academic and technical skills.
CRP4. Communicate clearly and effectively and with reason
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
CRP11. Use technology to enhance productivity

Modifications *For ELL/IEPs/504s/At-Risk Learners:*
Resources by Chapter:

- Practice A and Practice B
- Puzzle Time

Student Journal: Practice
Pair Activity for ELL p. 470 TE

Differentiating the Lesson:

- Small group
- Diagrams and illustrations
- Partially completed examples with essential terms highlighted or underlined
- Have students draw the graphs from ore Concepts section 9.3 in their notebooks. P. 478 TE

Skills remediation: IXL

Khan Academy in Spanish

Modifications for Gifted And Talented
Advanced questioning
Online Resources
Enrichment and Extension
Start the Next Section
Differentiation
Introduce the Unit Circle
TI-84 Activity on the Unit Circle

Possible Additional Resources:
www.desmos.com
www.GeoGebra.com

Khan Academy Angles and Radian Measure

Illustrative Mathematics: F.TF.A.1 Bicycle Wheel, F.TF.A.2 What exactly is a radian?, F.TF.A.2 Trigonometric functions for arbitrary angles (radians)

NJCTL Resources Radical Functions and Rational Exponents

WEEK 34: **NJSLA-M**

WEEK 35
Essential Question: What are the characteristics of the graphs of sine and cosine functions?

NJSLS Standards	**Concepts** *What student will know.*	**Skills** *What students will be able to do.*	**Activities**	**Assessments and Checks for Understanding**
F.IF.C.7e - Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude. **F.BF.B.3** - Identify the effect on the graph of replacing *f(x)* by *f(x) + k*, *k f(x)*, *f(kx)*, and *f(x + k)* for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from	***Lesson Vocabulary:*** Amplitude, periodic function, cycle, period, phase shift, midline ***Learning Goals:*** 97. To understand the characteristics of sine and cosine functions. 98. To shrink and stretch graphs of sine and cosine functions.	• Use and apply vocabulary terms in context. • Graphs sine and cosine functions • Stretch and shrink sine and cosine functions • Translate sine and cosine functions • Reflect sine and cosine functions	• Exploration 1:Graphing Sine functions and 2: Graphing Cosine functions • Core Concepts on pp. 486, 487, 488 ○ Characteristics of *y = sin x* and *y = cos x* ○ Amplitude and Period ○ Graphing *y = asin b(x-h) + k* and *y= a cosb(x-h) +k*	***Formative:*** Analyzing Student classwork Strategic Questioning Student discussion Turn and Talk Think Pair Share Monitor progress questions pp. 488-490 Error Analysis, p. 492 Thumbs up, Thumbs down Exit Slips Do Nows Graphic Organizers, Quizzes Leveled Classwork p. 491, TE Leveled Homework p. 491, TE Mini Assessment p. 494 TE

their graphs and algebraic expressions for them. **MP.1** Make sense of problems and persevere in solving them. **MP.2** Reason abstractly and quantitatively. **MP.3** Construct viable arguments & critique the reasoning of others. **MP.4** Model with mathematics **MP.5** Use appropriate tools strategically. **MP.6** Attend to precision. **MP.7** Look for and make use of structure. **MP.8** Look for and express regularity in repeated reasoning.	99. To translate sine and cosine functions. 100. To graph the reflections of sine and cosine.			***Summative:*** Topic Tests Projects **Benchmark Assessments:** Every 5-6 weeks. **Alternative:** Use dynamic assessment and investigations on online platform. Questioning Journal responses Illustrations, computer projects, oral response, creative presentations or demonstration, etc Performance Assessment Tasks
Interdisciplinary Connections and Activities: **NJSLS-ELA** 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.				

RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.

RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

RST.11-12.10 By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.

W.11-12.1 Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.

W.11-12.2.D Use precise language, domain-specific vocabulary, and techniques such as metaphor, simile, and analogy to manage the complexity of the topic.

NJSLS-Technology:

Students will participate in activities on Google Classroom and other online resources, Desmos. GeoGebra, IXL

8.1.12.A.3 Collaborate in online courses, learning communities, social networks or virtual worlds to discuss a resolution to a problem or issue.

Career Ready Practices:

Students will use Desmos, GeoGebra or the TI-84 calculator to assist in graphing and analyzing these equations. They will discuss their findings with the instructor and their classmates.

CRP2. apply appropriate academic and technical skills.
CRP4. Communicate clearly and effectively and with reason
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
CRP11. Use technology to enhance productivity

Modifications *For ELL/IEPs/504s/At-Risk Learners:* Resources by Chapter: ● Practice A and Practice B ● Puzzle Time Student Journal: Practice Differentiating the Lesson: ● Small group ● Diagrams and illustrations ● Partially completed examples with essential terms highlighted or underlined Skills remediation: IXL Khan Academy in Spanish	**Modifications for Gifted And Talented** Advanced questioning Online Resources Enrichment and Extension Start the Next Section Differentiation Explore even and odd functions
Possible Additional Resources: www.desmos.com www.GeoGebra.com Mathematics Assessment Resource Service Representing Trig Functions Illustrative Mathematics F.BF.B.3 Exploring Sinusoidal Functions, F.BF.B.3 Transforming the graph of a function Khan Academy Sine and Cosine Functions TI-84 Activities : Trigonometry	
WEEK 36 **Essential Question(s):** How can you verify a trigonometric identity?	

SUBJECT: MATHEMATICS HIGH SCHOOL

Cliffside Park Public Schools

GRADE: 11

BOE APPROVAL: August 2018

NJSLS Standards	Concepts *What student will know.*	Skills *What students will be able to do.*	Activities	Assessments and Checks for Understanding
F.TF.C.8 - Prove the Pythagorean identity $\sin^2(\theta) + \cos^2(\theta) = 1$ and use it to find $\sin(\theta)$, $\cos(\theta)$,or $\tan(\theta)$ given $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ and the quadrant of the angle. **MP.1** Make sense of problems and persevere in solving them. **MP.2** Reason abstractly and quantitatively. **MP.3** Construct viable arguments & critique the reasoning of others. **MP.4** Model with mathematics **MP.5** Use appropriate tools strategically. **MP.6** Attend to precision. **MP.7** Look for and make use of structure. **MP.8** Look for and express regularity in repeated reasoning.	***Lesson Vocabulary:*** Trigonometric Identity ***Lesson Concepts:*** 101. To use trigonometric identities to evaluate trigonometric functions and simplify trigonometric expressions. 102. To verify trigonometric identities	• Use and apply vocabulary terms in context. • Find trigonometric Values • Simplify trigonometric Expressions • Verify a trigonometric identity .	• Exploration 1 Writing a Trigonometric Identity Exploration 2 Writing other Trigonometric identities p. 513 • Discuss vocabulary • Core Concepts p. 514 ○ Fundamental Trigonometric Identities • Real World Applications p. 518	***Formative:*** Analyzing Student classwork Strategic Questioning Student discussion Error Analysis, p. 517 Monitoring progress pp.515, 516 Exit Slips Do Nows Homework Quizzes Mini assessment p. 518 TE Leveled homework p. 517 ***Summative:*** Topic Tests Projects **Benchmark Assessments:** Every 5-6 weeks. **Alternative:** Use dynamic assessment and investigations on online platform.

				Questioning Journal responses Illustrations, computer projects, oral response, creative presentations or demonstration, etc Performance Assessment Tasks

Interdisciplinary Connections and Activities:

NJSLS-ELA

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.

RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.

RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

RST.11-12.10 By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.

W.11-12.1 Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.

W.11-12.2.D Use precise language, domain-specific vocabulary, and techniques such as metaphor, simile, and analogy to manage the complexity of the topic.

NJSLS-Technology:

Students will participate in activities on Google Classroom and other online resources, Desmos. GeoGebra, IXL

8.1.12.A.3 Collaborate in online courses, learning communities, social networks or virtual worlds to discuss a resolution to a problem or issue.

Career Ready Practices:

Students will use Desmos, GeoGebra or the TI-84 calculator to assist in graphing and analyzing these equations. They will discuss their findings with the instructor and their classmates.
CRP2. apply appropriate academic and technical skills.
CRP4. Communicate clearly and effectively and with reason
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
CRP11. Use technology to enhance productivity

Modifications *For ELL/IEPs/504s/At-Risk Learners:*	**Modifications for Gifted And Talented**
Resources by Chapter: ● Practice A and Practice B ● Puzzle Time Student Journal: Practice Differentiating the Lesson: ● Small group ● Diagrams and illustrations ● Partially completed examples with essential terms highlighted or underlined Skills remediation: IXL	Advanced questioning Online Resources Enrichment and Extension Differentiation Start the Next Section

Simplified Language ELL p. 514 TE Khan Academy in Spanish	

Possible Additional Resources:
www.desmos.com
www.GeoGebra.com

Khan Academy Rational Relations

Illustrative Mathematics: F.TF.C.8 Trigonometric Ratios and the Pythagorean Theorem

WEEK 37
Essential Question: How can you determine whether two events are independent or dependent?
How can you construct and interpret a two-way table?

NJSLS Standards	**Concepts** *What student will know.*	**Skills** *What students will be able to do.*	**Activities**	**Assessments and Checks for Understanding**
S.CP.A.1 - Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not"). **S.CP.A.2 -** Understand that two events *A* and *B* are	***Lesson Vocabulary:*** Independent events, dependent events, conditional probability, two-way table, joint frequency, marginal frequency, joint relative frequency, marginal	• Use and apply vocabulary terms in context. • Determine whether events are independent events • Find probabilities of independent and dependent events	• Exploration 1 p. 545, Identifying Independent and Dependent Events • Exploration 2 p. 545, Finding Experimental Probabilities • Exploration 3 p. 545 Finding Theoretical Probabilities • Exploration 1 p. 553	***Formative:*** Analyzing Student classwork Strategic Questioning Student discussion Error Analysis, pp. 551. 559 Think-pair-Share Monitoring progress pp. 547-549; pp. 554-557 Exit Slips Do Nows

independent if the probability of *A* and *B* occurring together is the product of their probabilities, and use this characterization to determine if they are independent. **S.CP.A.3 -** Understand the conditional probability of *A* given *B* as *P*(*A* and *B*)/*P*(*B*), and interpret independence of *A* and *B* as saying that the conditional probability of *A* given *B* is the same as the probability of *A*, and the conditional probability of *B* given *A* is the same as the probability of *B*. **S.CP.A.4 -** Construct and interpret two way frequency tables of data when two categories are associate with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities. **S.CP.A.5 -** Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations.	relative frequency, conditional relative frequency ***Learning Goals:*** 103. Determine whether events are independent 104. Finding the probability of independent events. 105. Finding the probability of dependent events. 106. Compare independent and dependent events 107. Find conditional probabilities. 108. To create a two-way tables. 109. To find joint and marginal relative frequencies.	• Find conditional probabilities • Make two-way tables • Find relative and conditional relative frequencies • Use conditional relative frequencies to find conditional probabilities	○ Completing and using a two-way table • Exploration 2 p. 553 ○ Two-Way Tables and Probability • Exploration 3 p. 553 ○ Conducting a Survey • Discuss vocabulary in context • Core Concepts ○ Probability of Independent Events p. 546 ○ Probability of Dependent Events p. 547 ○ Relative and Conditional Relative Frequencies p. 555 • Finding conditional probabilities p. 549 • FInding Relative and Conditional Relative Frequencies p. 555	Homework Quizzes Mini assessment p. 553 TE, 560 p 560 Leveled practice and homework p. 550 TE p. 558 TE ***Summative:*** Dynamic Assessment Tool Topic Tests Projects **Benchmark Assessments:** Every 5-6 weeks. **Alternative:** Use dynamic assessment and investigations on online platform. Questioning Journal responses Illustrations, computer projects, oral response, creative presentations or demonstration, etc Performance Assessment Tasks

S.CP.B.6. Find the conditional probability of *A* given *B* as the fraction of *B*'s outcomes that also belong to *A,* and interpret the answer in terms of the model. **S.CP.B.8** (+) Apply the general Multiplication Rule in a uniform probability model, P(A and B) = P(A)P(B|A) = P(B)P(A|B), and interpret the answer in terms of the model. **MP.1** Make sense of problems and persevere in solving them. **MP.2** Reason abstractly and quantitatively. **MP.3** Construct viable arguments & critique the reasoning of others. **MP.4** Model with mathematics **MP.5** Use appropriate tools strategically. **MP.6** Attend to precision. **MP.7** Look for and make use of structure.	110. To find conditional probabilities.			

MP.8 Look for and express regularity in repeated reasoning.				

Interdisciplinary Connections and Activities:

NJSLS-ELA

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.

RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.

RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

RST.11-12.10 By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.

W.11-12.1 Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.

W.11-12.2.D Use precise language, domain-specific vocabulary, and techniques such as metaphor, simile, and analogy to manage the complexity of the topic.

NJSLS-Technology:

Students will participate in activities on Google Classroom and other online resources, Desmos. GeoGebra, IXL

8.1.12.A.3 Collaborate in online courses, learning communities, social networks or virtual worlds to discuss a resolution to a problem or issue.

Career Ready Practices:

Students will use Desmos, GeoGebra or the TI-84 calculator to assist in graphing and analyzing these equations. They will discuss their findings with the instructor and their classmates.

CRP2. apply appropriate academic and technical skills.
CRP4. Communicate clearly and effectively and with reason
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
CRP11. Use technology to enhance productivity

Modifications *For ELL/IEPs/504s/At-Risk Learners:*
Resources by Chapter:
- Practice A and Practice B
- Puzzle Time

Student Journal: Practice
Differentiating the Lesson:
- Small group
- Diagrams and illustrations
- Partially completed examples with essential terms highlighted or underlined

Skills remediation: IXL

Khan Academy in Spanish

Modifications for Gifted And Talented
Advanced Questioning
Online Resources
Enrichment and Extension
Start the Next Section
Differentiation
Experimentation

Possible Additional Resources:
www.desmos.com
www.GeoGebra.com

Khan Academy Independent and dependent probability, Interpreting two-way tables

Illustrative Mathematics: S.CP.A.1 Describing Events, S.CP.A.2 Cards and Independence, S.CP.A.3 Lucky Envelopes , S.CP.A.4 Two-Way Tables and Probability, S.CP.A.5 Breakfast Before School, S.CP.B.6 The Titanic 1, S.CPA.B.8 False and Positive Test Results

SUBJECT: MATHEMATICS HIGH SCHOOL

Cliffside Park Public Schools

GRADE: 11

BOE APPROVAL: August 2018

WEEK 38

Essential Question: How can you find probabilities of disjoint and overlapping events?
How can a tree diagram help you visualize the number of ways in which two or more events can occur?
How can you determine the frequency of each outcome of an event?

NJSLS Standards	**Concepts** *What student will know.*	**Skills** *What students will be able to do.*	**Activities**	**Assessments and Checks for Understanding**
S.CP.A.1 - Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not"). **S.CP.B.7 -** Apply the Addition Rule, P(A or B) = P(A) + P(B) – P(A and B), and interpret the answer in terms of the model. **MP.1** Make sense of problems and persevere in solving them. **MP.2** Reason abstractly and quantitatively. **MP.3** Construct viable arguments & critique the reasoning of others. **MP.4** Model with mathematics	***Lesson Vocabulary:*** Compound event, overlapping events, disjoint and mutually exclusive events, permutation, n factorial, combination, Binomial Theorem, random variable, probability distribution, binomial distribution, binomial experiment ***Learning Goals:*** 111. Find the probability of disjoint events. 112. Find the probability of overlapping events	• Use and apply vocabulary terms in context. • Find probabilities of compound events • Use more than one probability rule to solve real-life problems • Use the formula for number of permutations. • Use the formula for the number of combinations. • Use combinations and the Binomial Theorem to expand binomials.	• Exploration 1 p. 563, Disjoint Events and Overlapping Probabilities • Exploration 2 p. 563, Finding the probability that two events occur • Exploration 3 p. 563, Discovering Probability Formulas • Exploration 1 p. 569, Reading a Tree Diagram • Exploration 2 p. 569, Reading a Tree Diagram • Exploration 3 p. 569 Writing a Conjecture • Exploration 1 p. 579, Analyzing Histograms • Exploration 2 p. 579, Determining the Number of Occurrences • Core Concepts;	***Formative:*** Analyzing Student classwork Strategic Questioning Student Discussion Error Analysis pp. 567, 578, 584 Partner Speaks p. 566 TE Monitoring progress pp. 565, 566; 570-574, 581-582 Partner Speaks p.566 Thumbs Up p.573, 581, Predict, explain and Observe p. 572. 573 TE Think pair share p. 582 TE Exit Slips p. 566, 582 Do Nows Homework Quizzes Mini assessment p. 568, 578, 584 TE Leveled practice and homework p. 567, 575, 583

MP.5 Use appropriate tools strategically. **MP.6** Attend to precision. **MP.7** Look for and make use of structure. **MP.8** Look for and express regularity in repeated reasoning.	113. Use formulas to find *P(A and B)*. 114. Find the number of permutations in a sample set. 115. Use the permutation formula. 116. Find a probability using permutations. 117. Count combinations. 118. Use combination formulas 119. Find the probability using combinations. 120. Construct probability distributions. 121. Interpreting a probability distributions. 122. Construct a Binomial Distribution. 123. Interpret a Binomial Distribution.	• Construct and interpret probability distributions • Construct and interpret binomial distributions.	○ Probability of Compound Events p. 564 ○ Permutations p. 572 ○ The Binomial Theorem p. 574 ○ Probability Distributions p. 580 ○ Permutations p. 571 ○ Combinations p. 572 ○ The Binomial Theorem p. 574 ○ Probability Distributions p. 580 ○ Binomial Experiments p. 581	***Summative:*** Dynamic Assessment Tool Topic Tests Projects **Benchmark Assessments:** Every 5-6 weeks. **Alternative:** Use dynamic assessment and investigations on online platform. Questioning Journal responses Illustrations, computer projects, oral response, creative presentations or demonstration, etc Performance Assessment Tasks

Interdisciplinary Connections and Activities:

NJSLS-ELA

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.

RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.

RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

RST.11-12.10 By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.

W.11-12.1 Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.

W.11-12.2.D Use precise language, domain-specific vocabulary, and techniques such as metaphor, simile, and analogy to manage the complexity of the topic.

NJSLS-Technology:

Students will participate in activities on Google Classroom and other online resources, Desmos. GeoGebra, IXL

8.1.12.A.3 Collaborate in online courses, learning communities, social networks or virtual worlds to discuss a resolution to a problem or issue.

Career Ready Practices:

Students will use Desmos, GeoGebra or the TI-84 calculator to assist in graphing and analyzing these equations. They will discuss their findings with the instructor and their classmates.

CRP2. apply appropriate academic and technical skills.
CRP4. Communicate clearly and effectively and with reason
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
CRP11. Use technology to enhance productivity

Modifications *For ELL/IEPs/504s/At-Risk Learners:*
Resources by Chapter:
- Practice A and Practice B
- Puzzle Time

Student Journal: Practice

ELL: Review Comprehension p. 564 TE
Stress vocabulary p. 572

Differentiating the Lesson:
- Small group
- Diagrams and illustrations
- Partially completed examples with essential terms highlighted or underlined
- Use Kinesthetic Activity p. 570 TE

Skills remediation: IXL

Khan Academy in Spanish

Modifications for Gifted And Talented
Advanced questioning
Online Resources
Enrichment and Extension
Start the Next Section
Differentiation

Possible Additional Resources:
www.desmos.com
www.GeoGebra.com

Illustrative Mathematics: S.CP.A.1 Describing Events , S.CP.B.7 The Addition Rule, S.CP.B.7 Rain and Lightning Khan Academy Addition Rule for Probability
WEEK 39 Final Project/Exam

Integrated Differentiation/Accommodations/Modifications for Algebra 2 Unit 4 *(Alternate Modes of Instruction and Support)*		
Modifications to Support Gifted and Talented Students	**Modifications to Support English Language Learners**	**Modifications to Support Our Learners (Students with IEPs/504s and At-Risk Learners)**
See specific modifications in each lesson. Integrate Higher Order Thinking Skills (HOTS) through questioning and extension projects specific to linear equations, inequalities and functions Provide menu of challenge activities for when the child finishes the lesson early (integrate technology when possible). College/Career Readiness skill enhancement - G & T students can research professions related to the Algebra. Have the student teach the lesson - peer tutoring (research-based strategy) Accelerate pace for students who are advanced in concepts. Use inquiry-based, discovery learning approaches that emphasize open-ended problems with multiple solutions or multiple paths to solutions. Allow students to design their own ways to find the answers to complex questions.	See specific modifications in each lesson. **Concept/Idea Map** - teacher models note-taking on trigonometric functions, graphing sine and cosine functions, trigonometric identities, computing probabilities, using two-way tables, permutations and combinations and the binomial theorem. **Contextualize language** See each lesson for specific vocabulary **Visuals and illustrations** to be used for performing operations on functions, inverse functions,graphing rational functions and other concrete terms. **Word/picture bank** available for students' reference in classroom, online and in their textbooks. **Wait Time Two** - extend basic "Wait Time" - after the 1st student responds to a question, the teacher waits an additional 5 - 7 seconds before calling on another student to ask a question about this unit.	See specific modifications in each lesson. Review student individual educational plan and/or 504 plan for instructional, assessment, and environmental supports. Allow student to use calculator to solve problems involving graphing. Teach students how to check the accuracy of the solution that was derived from use of the graphing calculator. Utilize manipulatives and/or visuals within instructional presentation of graphing functions. Teach students how to check the accuracy of the solution that was derived from use of the calculator or other method. Provide graph paper to aid in aligning performing arithmetic operations on functions. Utilize graphic organizer or partially completed template for students to solve word problems and other complex problems in the unit. Provide study guides that are partially completed by teacher, allowing the student to fill in missing

	Native Language Supports (peer, online assistive technology, translation device, bilingual dictionary) Teach the text backward - **frontload** the concepts and vocabulary needed for learning the material and activating prior knowledge vocabulary, see specific lesson for vocabulary list. Use a **word square** to teach target academic vocabulary for this unit. Support comprehension of unknown vocabulary, by providing examples of Note-taking, highlighting, underlining, etc. Students should be given copies of grade level material or text so they can highlight or underline pertinent information. Provide students with a sample problem or list of steps or procedures for multi-step solutions to problems. Allow student to reference these procedures when solving independently.	information during instruction in order to aid in obtaining information pertaining to modeling functions and graphs of functions. Utilize visual aids such as charts or graphs connected to trigonometric functions, graphing sine and cosine functions, trigonometric identities, computing probabilities, using two-way tables, permutations and combinations as well as the binomial theorem. By utilizing individual student assessment results, the teacher will provide small group or remedial instruction to review essential questions/big ideas, key concepts and provide additional explanations, more examples, and to model procedures in finding the solutions to particular problems. Provide wait time to allow students to process orally presented information and questions relating to the unit. Access to word/picture banks to develop an understanding and use content-specific vocabulary. Allow for Student Choice: Students should be permitted to demonstrate understanding of content through illustrations, computer projects, oral response, creative presentations or demonstration, etc. Support comprehension of unknown vocabulary, by providing examples of Note-taking, highlighting, underlining, etc. Students should be given copies of grade level material or text so they can highlight or underline pertinent information. Text to speech/Oral reading if necessary

		Provide students with flexible seating options while working independently, depending on need or preference. Math-specific vocabulary and literary terms should be pre-taught before teaching relevant concepts. Allow extra time to complete in class written assignments. Provide students with a sample problem or list of steps or procedures for multi-step solutions to problems. Allow student to reference these procedures when solving independently. Reduce the number of assigned problems within a unit. Provide models or templates to teach the structure of how to solve problems systematically. If necessary, provide additional set of materials or online access so that students can utilize resources at school and home. Provide study guide for students to review before Unit quizzes or tests. Review essential questions/big ideas of trigonometric functions, graphing sine and cosine functions, trigonometric identities, computing probabilities, using two-way tables, permutations and combinations and the binomial theorem to provide additional explanations, more examples, and to model procedures in finding the solutions to particular problems.

		Provide wait time to allow students to process orally presented information and questions relating to the unit. Modify tests to address big ideas/essential questions of the unit.

Sources:
New Jersey Student Learning Standards (2016)- Math https://www.state.nj.us/education/cccs/2016/math/standards.pdf
New Jersey Student Learning Standards (2016) -ELA https://www.state.nj.us/education/cccs/2016/ela/g1112.pdf
New Jersey Student Learning Standards (2016)- Science https://www.state.nj.us/education/cccs/2016/science/
New Jersey Student Learning Standards: Technology (2014) http://www.state.nj.us/education/cccs/2014/tech/8.pdf
Career Ready Practices (2014) http://www.state.nj.us/education/cccs/2014/career/CareerReadyPractices.pdf