Algebra 2 Grade 11

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Superintendent of Schools:

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Algebra 2

Course Description:

High school Algebra II is taught in seven units throughout the school year. This course is designed to be an extension into topics that are taught in Algebra I, as well as an introduction to topics that will aid in transitioning to higher-level math courses. Students in Algebra II will become fluent with a variety of different function families and the ways the same concepts can be threaded through each family. While the foundation remains unchanged, students will look more in depth at how the present family of functions that is being studied affects the formulas and equations. The course also focuses on the use of graphing calculator to facilitate the solving of equations and modeling of real-world problems. The curriculum ends with a look into statistical analysis and probability.

Taking part in this course helps students:

- 1. To foster an appreciation of mathematics.
- 2. To observe math in the world around them.
- 3. To meet the New Jersey Student Learning Standards for New Jersey Public Schools.

Course Sequence:

Unit 1: Quadratic Functions (25 days) Unit 2: Polynomial Functions (26 days) Unit 3: Rational Exponent and Radical Functions (22 days) Unit 4: Exponential and Logarithmic Functions (22 days) Unit 5: Rational Functions (21 days) Unit 6: Probability (18 days) Unit 7: Data Analysis and Statistics (18 days)

*The number of instructional days is an estimate based on the information available at this time. 1 day equals approximately 48 minutes of seat time. Teachers are strongly encouraged to review the entire unit of study carefully and collaboratively to determine whether adjustments to this estimate need to be made.

Pre-requisite:

Algebra I

Unit # 1 - Overview

Content Area: Algebra 2

Unit Title: Quadratic Functions

Grade Level: 10/11

Core Ideas: Students will work with the family of quadratic functions. The unit will cover working with different forms of the same equation, solving quadratics with a variety of different methods, and comparing graphs and solutions of quadratic equations to that of quadratic inequalities. Students will learn to determine which method is appropriate based on the form of the equation given.

Unit # 1 - Standards				
Standards (Content and Techn	ology):			
CPI#:	Statement:			
Performance Expectations (N	(JSLS)			
NJSLS.N-CN.A.2	Use the relation i^2 = -1 and the commutative, associative, and distributive properties to			
	add, subtract, and multiply complex numbers.			
NJSLS.A-SSE.B.3a	Factor a quadratic expression to reveal the zeros of the function it defines			
NJSLS.F-IF.C.7a	Graph functions expressed symbolically and show key features of the graph, by hand in			
	simple cases and using technology for more complicated cases.			
	a. Graph linear and quadratic functions and show intercepts, maxima, and minima.			
NJSLS.A-REI.B.4a	Solve quadratic equations in one variable.			
	a. Use the method of completing the square to transform any quadratic equation in x into			
	an equation of the form $(x-p)^2 = q$ that has the same solutions. Derive the quadratic			
	formula from this form.			
NJSLS.A-REI.B.4b	Solve quadratic equations in one variable.			
	b. Solve quadratic equations by inspection (e.g., for $x = 49$), taking square roots,			
	completing the square, the quadratic formula and factoring, as appropriate to the initial			
	form of the equation. Recognize when the quadratic formula gives complex solutions and			
	write them as $a \pm bi$ for real numbers a and imaginary numbers b			
NJSLS.N-CN.C.7	Solve quadratic equations with real coefficients that have complex solutions.			
Mathematical Practices				
MP 1	Make sense of problems and persevere in solving them.			
MP 2	Reason abstractly and quantitatively.			
MP 3	Construct viable arguments and 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.			
Career Readiness, Life Litera	icies, and Key Skills			
9.2.12.CAP.5	Assess and modify a personal plan to support current interests and postsecondary plans.			
9.4.12.CI.1	Demonstrate the ability to reflect, analyze, and use creative skills and ideas			
9.4.12.CI.3	Investigate new challenges and opportunities for personal growth, advancement, and			
	transition			
9.4.12.TL.4	Collaborate in online learning communities or social networks or virtual worlds to			
	analyze and propose a resolution to a real-world problems			
Computer Science and Design	n Thinking			
8.1.12.CS.2	Model interactions between application software, system software, and hardware			
8.2.12.ITH.3	Analyze the impact that globalization, social media, and access to open source			
	technologies has had on innovation and on a society's economy, politics, and culture			
8.2.12.EC.2	Assess the positive and negative impacts of emerging technologies on developing			
	countries and evaluate how individuals, non-profit organizations, and governments have			
	responded			
Intercultural Statements (Am	iistad. Holocaust. LGBT. etc)			

LGBTO and Disabilities	Explore mathematicians in the	LGBTO and disabled community, including but not				
NJSA 18A:35-4.35	limited to Juliette Bruce, NSF Postdoctoral Fellow at University of California, Berkeley					
	and Stephen Hawking, former	Director of Research at the University of Cambridge.				
Amistad Law	Explore African-American ma	thematicians and scientists including but not limited to				
NJSA 18A:35-4.43	Martha Euphemia Lofton Havi	nes, the first African-American woman to earn a Ph.D in				
	mathematics and Elbert Fran	Cox the first African-American man to earn a Ph D in				
	mathematics in the world	Cox, the first random random man to early a find in				
	Discuss and analyze the movie	Hidden Figures, the story of female African-American				
	mathematicians and engineers	who worked for NASA				
Holocaust Law	Explore Jewish mathematiciar	as using the article "Jewish Mathematicians Who Changed				
NJSA 18A:35-28	the Course of History" from je	ewishjournal.com				
AAPI Law	Explore Asian-American and I	Pacific Islander mathematicians and scientists, including				
NJSA 18A:25-4.44	but not limited to Dr. Peter Tsa	ai, inventor of the N95 respirator and Diana Ma, data				
	scientist and statistician for the Lakers					
Companion Standards						
RST.9-10.7	Translate quantitative or techn	ical information expressed in words in a text into visual				
	form (e.g. a table or chart) and	translate information expressed visually or				
	mathematically (e.g. in an equ	ation) into words				
RST 11-12 7	Integrate and evaluate multiple	e sources of information presented in diverse formats and				
	media (e.g. quantitative data	video multimedia) in order to address a question or solve a				
	problem.	video, indianceda) in order to address a question of solve a				
RST 11-12.8	Evaluate the hypotheses data	analysis and conclusions in a science or technical text				
101.11 12.0	verifying the data when possib	le and corroborating or challenging conclusions with other				
	sources of information	te and corroborating of charlenging conclusions with other				
RST 11-12 9	Synthesize information from a	range of sources (e.g. texts experiments simulations)				
K51.11-12.9	into a coherent understanding of a process, phenomenon, or concept, resolving					
	conflicting information when possible.					
SI 11-124	Present information findings	and supporting evidence clearly, concisely, and logically				
SL.11-12.4	The content organization dev	elopment and style are appropriate to task, purpose and				
	audience	crophient, and style are appropriate to task, purpose and				
Interdisciplingry Connection	addience.					
6 1 12 HistorySE 14 a	Explore the various ways wor	en racial and ethnic minorities, the LGBTO community				
0.1.12.1113to1y5L.14.a	and individuals with disabilitie	es have contributed to the American economy politics and				
	society	s have contributed to the ranchedin contomy; pointies and				
6 1 12 HistorySE 14 b	Use a variety of sources from (liverse perspective to analyze the social economic and				
0.1.12.1115(01951).14.0	political contributions of marg	inalized and underrepresented groups and/or individuals				
CASEL 5 SEL Framework	ASEL 5 SEL Framework					
Self-A wareness	-Demonstrate honesty and inte	arity				
Sell-Atwareness	-Experience self-efficacy	giny				
	-Develop interests and a sense	of nurnose				
Social Awaranass	Pacogniza strengths in others					
Social Awareness	-Recognize strengths in others	uda				
Salf Managament	Identify and use stress manage	amont stratagies				
Sen-Management	-Identify and use stress manage	f motivation				
	-Exhibit sen-discipline and sen	n-labilla				
Polationshin Skills	Communicate offectively					
Kerauonsnip Skins	Practice teamwork and cellah	orative problem solving				
	-i factice teamwork and collabo	v when needed				
Posponsible Decision	Domonstrate surjesity and an	on mindedness				
Making	Learn to make a reasoned ind	ament after analyzing information data facts				
	-Learn to make a reasoned judgment after analyzing information, data, facts					
Unit Econtial Question (a)		Ing skins are user ar board inside & outside of school				
Unit Essential Question(s):	a functions to model real	Unit Enduring Understandings: • Overlaptic parent function $(x - x^2)$				
• now can we use quadratic	s functions to model real	• Quadratic parent function $(y = x^2)$				
• Parabola, axis of symmetry, vertex, max./min.						
Why do we need the different but equivalent forms of Real solutions of equations show the zeros of						

a quadratic function?			the f	functions which are the x	-intercepts	of the
• How can we decide that the quadratic function will			graphs.			
be the best fit for a real life situation?			• Imaginary numbers $(i = \sqrt{-1}; i^2 = -1)$			
• Can the real number system be extended?			 Complex number set includes all real numbers. 			
• Why do we need c	omplex numbers?		Disc	criminant determines nun	ber and typ	be of
• How do we use the	e method of completing th	ne square	solu	tions.	51	
to transform any q	uadratic expression?					
• How can we solve	quadratic equations by ta	ıking				
square roots, com	bleting the square, the Ou	adratic				
Formula, and facto	oring?					
• How can we solve	quadratic inequalities?					
	1	Evidence of	Learning			
Formative Assessment Summative/Benchmar Alternative Assessmen	s: Do Now, Homework, k Assessment(s): Quizze ts: Portfolios, Online As	On-spot Chec es, Chapter Re signments	king for Un views, Cha	nderstanding, Teacher Feo pter Tests	edback	
Resources/Materials:			Key Vocab	oulary:		
https://njctl.org/courses/	math/algebra-ii/		quadratic, s	tandard/vertex/intercept	forms, axis	of
			symmetry,	vertex, factoring, square	roots, comp	oleting the
			square, Qua	adratic Formula, complex	number, d	iscriminant
Suggested Pacing Guide					1	
Lesson Name/Topic	Student Learning O	Student Learning Objective(s)			Suggested Tasks/Activities: Day(s Com	
Quadratics in Standard	-Graphing quadratics	-Graphing quadratics in standard form (with			, Review	2 days
Form	axis of symmetry and	axis of symmetry and vertex)				
Quadratics in Vertex	-Graphing quadratics in vertex and intercept			Lesson, Application	, Review	2 days
and Intercept Forms	forms (with axis of s	ymmetry and v	vertex)	T	D	4 1
Factoring Quadratics	quadratics by factoring	i completely al	nd solving	Lesson, Application	, Review	4 days
Square Roots	-Solving quadratics b simplifying non-perfe	y square roots ect radicals	and	Lesson, Application	, Review	2 days
Complex Numbers	-Defining the complex number system and Lesson, Application, Review 2 days solving quadratics with complex solutions				2 days	
Completing the Square	-Solving quadratics with complex solutions -Solving quadratics by completing the square Lesson, Application, Review 3 days			3 days		
	form	idard form int	o vertex			
Quadratic Formula	-Solving quadratics u	sing the Quad	ratic	Lesson, Application	, Review	2 days
	Formula	0 0			,	5
	-Calculating the discr	riminant to det	termine type	e		
	and number of solution	ons				
Quadratic Inequalities	-Graphing quadratic	inequalities on	a coordina	te Lesson, Application	, Review	3 days
	-Solving quadratic in	equalities orar	hically and	1		
	-sorving quadratic mequatities graphically and algebraically					
Teacher Notes: 25 tota	l days including assessme	ent days (quizz	zes, test)			I
Additional Resources:		• ` 1				
	Differen	ntiation/Modi	fication St	rategies		
Students with	English Language	Gifted and	Talented	Students at Risk	504 S	Students
Disabilities	Learners	Stude	ents			
-Rephrase questions	-Allow errors in	-Provide exte	ension	-Consult with	-Rephrase	auestions
directions, and	speaking	activities		Guidance Counselors directions, and		, and
explanations		-Build on stu	idents'	and follow I&RS	explanatio	ons
		intrinsic mot	ivations	procedures		

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-Allow extended time	-Rephrase questions,	-Consult with	-Allow extended time
on assessments	directions, and	classroom teacher(s)	on assessments
-Consult with Case	explanations	for specific behavior	-Consult with
Managers and follow	-Allow extended time	interventions	Guidance Counselors
IEP	on assessments	-Provide extended	and 504 Committees
modifications/accom		time to complete tasks	to come up with
modations		(on need basis)	procedures/504
			accommodations

Unit # 2- Overview

Content Area: Algebra 2

Unit Title: Polynomial Functions

Grade Level: 10/11

Core Ideas: Students will work with the family of polynomial functions. The unit will cover higher-degree polynomials and their characteristics and relating the factoring patterns of quadratics to polynomials. Students will also apply the Remainder, Factor, and Rational Theorems to polynomials to solve for zeros. Graphing calculators will be used for their CALCULATE and GRAPH features to aid the solving process. The Fundamental Theorem of Algebra will be used to further classify polynomials based on the number and type of solutions.

Unit # 2 - Standards					
Standards (Content and Techn	nology):				
CPI#:	Statement:				
Performance Expectations (N	NJSLS)				
NJSLS.N-RN.A.1	Explain how the definition of the meaning of rational exponents follows from extending				
	the properties of integer exponents to those value, allowing for a notation for radicals in				
	terms of rational exponents.				
NJSLS.F-IF.C.7c	Graph functions expressed symbolically and show key feature of the graph, by hand in				
	simple cases and using technology for more complicated cases.				
	c. Graph polynomial functions, identifying zeros when suitable factorizations are				
	available, and showing end behavior.				
NJSLS.A-APR.A.I	Understand that polynomials form a system analogous to the integers, namely, they are				
	closed under the operations of addition, subtraction, and multiplication; add, subtract, and				
	multiply polynomials K_{result} and early the Demoinder Theorem For explore mining $r(x)$ and early worker x the				
NJSLS.A-APR.B.2	Know and apply the Remainder Theorem: For a polynomial $p(x)$ and and number <i>a</i> , the remainder on division by $y = a$ is $p(a) = 0$ if and only if $(y = a)$ is a factor of $p(y)$.				
NICLS A SSE A 2	remainder on division by x-a is $p(a)=0$ if and only if $(x-a)$ is a factor of $p(x)$.				
NJSLS.A-SSE.A.2	Use the structure of an expression to identify different ways to rewrite it.				
NJSLS.IN-CIN.C.9(+)	Now the Fundamental Theorem of Algebra, show that it is true for quadratic				
Mathematical Practices	porynomials.				
MD 1	Make sense of problems and persevere in solving them				
MP 2	Reason abstractly and quantitatively.				
MP 3	Construct viable arguments and 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				
Career Readiness, Life Liter	acies, and Key Skills				
9.2.12.CAP.5	Assess and modify a personal plan to support current interests and postsecondary plans.				
9.4.12.CL1	Demonstrate the ability to reflect, analyze, and use creative skills and ideas				
9.4.12.CL3	Investigate new challenges and opportunities for personal growth, advancement, and				
	transition				
9.4.12.TL.4	Collaborate in online learning communities or social networks or virtual worlds to				
	analyze and propose a resolution to a real-world problems				
Computer Science and Desig	n Thinking				
8.1.12.CS.2	Model interactions between application software, system software, and hardware				
8.2.12.ITH.3	Analyze the impact that globalization, social media, and access to open source				
	technologies has had on innovation and on a society's economy, politics, and culture				
8.2.12.EC.2	Assess the positive and negative impacts of emerging technologies on developing				
	countries and evaluate how individuals, non-profit organizations, and governments have				
	responded				
Intercultural Statements (An	nistad, Holocaust, LGBT, etc)				

I GBTO and Disabilities	Explore mathematicians in the	I GBTO and disabled community including but not			
NISA 18A.25 A 25	limited to Juliette Bruce NSE Postdoctoral Fellow at University of California Berkeley				
NJSA 10A.33-4.33	and Stophon Howking, former	Director of Descerch at the University of Cambridge			
A	England African American	the meticine and according to the University of Cambridge.			
Allistad Law	Explore African-African Ina Monthe Explore Lefter Here	the first African American warman to some a Dh D in			
NJSA 18A:33-4.43	Marina Eupnemia Loiton Hayi	nes, the first African-American woman to earn a Ph.D in			
	mathematics, and Elbert Frank	Cox, the first African-American man to earn a Ph.D in			
	mathematics in the world.				
	Discuss and analyze the movie	Hidden Figures, the story of female African-American			
	mathematicians and engineers	who worked for NASA			
Holocaust Law	Explore Jewish mathematician	as using the article "Jewish Mathematicians Who Changed			
NJSA 18A:35-28	the Course of History" from je	ewishjournal.com			
AAPI Law	Explore Asian-American and H	Pacific Islander mathematicians and scientists, including			
NJSA 18A:25-4.44	but not limited to Dr. Peter Tsai, inventor of the N95 respirator and Diana Ma, data				
	scientist and statistician for the Lakers				
Companion Standards	•				
RST.9-10.7	Translate quantitative or techni	ical information expressed in words in a text into visual			
	form (e.g., a table or chart) and	translate information expressed visually or			
	mathematically (e.g. in an equ	ation) into words			
RST 11-12 7	Integrate and evaluate multiple	sources of information presented in diverse formats and			
K91.11 12.7	media (e.g. quantitative data y	video multimedia) in order to address a question or solve a			
	problem	video, inditinedia) in order to address a question of solve a			
PST 11 12 8	Evaluate the hypotheses data	analysis, and conclusions in a science or technical text			
K51.11-12.0	varifying the data when possib	la and corresponding or challenging conclusions with other			
	courses of information	ie and corroborating of chanenging conclusions with other			
DST 11 12 0	Sources of information.	······································			
KS1.11-12.9	Synthesize information from a range of sources (e.g., texts, experiments, simulations)				
	into a coherent understanding of	conflicting information when possible			
	conflicting information when p	possible.			
SL.11-12.4	Present information, findings a	and supporting evidence clearly, concisely, and logically.			
	The content, organization, dev	elopment, and style are appropriate to task, purpose and			
	audience.				
Interdisciplinary Connection					
6.1.12.HistorySE.14.a	Explore the various ways wom	en, racial and ethnic minorities, the LGBTQ community,			
	and individuals with disabilitie	s have contributed to the American economy, politics and			
	society				
6.1.12.HistorySE.14.b	Use a variety of sources from a	liverse perspective to analyze the social, economic and			
	political contributions of marginalized and underrepresented groups and/or individuals				
CASEL 5 SEL Framework					
Self-Awareness	-Demonstrate honesty and inte	ority			
	-Experience self-efficacy	87			
	-Develop interests and a sense	of purpose			
Social Awareness	-Recognize strengths in others				
Social Tiwareness	-Understand and express gratit	nde			
Solf Managamant	Identify and use stress manage	amont stratagios			
Sen-Management	-Identify and use stress manage	f motivation			
	-Exhibit self-discipline and sel				
Dalatianakin Clailla	-Use planning and organization				
Relationship Skills	-Communicate effectively	. 11 1			
	-Fractice teamwork and collab	orative problem-solving			
	-Seek or otter support and help	o wnen needed			
Responsible Decision-	-Demonstrate curiosity and ope	en-mindedness			
Making	-Learn to make a reasoned judgment after analyzing information, data, facts				
	-Recognize how critical thinking skills are useful both inside & outside of school				
Unit Essential Question(s):		Unit Enduring Understandings:			
How can polynomial func	tions be used to model real	• Definition of a polynomial function			
life problems?		• End behavior of polynomial graphs			
• How can properties of line	ear and quadratic functions	• Polynomial division (Long and Synthetic)			

be generalized to polynomial functions?		Algebr	aic properties of polynomial fund	ctions
• What are some common characteristics of		 Degree of a polynomial tells how many roots it has 		
polynomial graphs?		(includ	ling repeated and imaginary)	
• How do we use the factors of a polynomial to solve				
a division problem	?			
 How do we factor a 	polynomial?			
• How do we factor a	portal Theorem of Alashus?			
• what is the Fundam	nental Theorem of Algebra?			
• How do the charact	eristics of quadratics apply to			
polynomials?				
	Evidence o	f Learning		
Formative Assessments	: Do Now, Homework, On-spot Che	ecking for Unde	erstanding, Teacher Feedback	
Summative/Benchmark	Assessment(s): Quizzes, Chapter R	Reviews, Chapte	er Tests	
Alternative Assessment	s: Portfolios, Online Assignments			
Resources/Materials:	-	Kev Vocabul	arv:	
https://njctl.org/courses/n	nath/algebra-ii/	polynomial fu	nctions degree leading coefficie	ent end
		behavior poly	nomial division Domaindar Tha	orom Eastor
		Denavior, pory		
		Theorem, Rati	ional Zero Theorem, Fundamenta	al Theorem
		of Algebra		
	Suggested P	acing Guide		
Lesson Name/Topic	Student Learning Objective(s)		Suggested Tasks/Activities:	Day(s) to
		• .1		Complete
Properties of	-Simplifying algebraic expressions	using the	Lesson, Application, Review	2 days
Exponents	properties of exponents			
	-Applying the properties of expone	ents to		
Delynamial Eurotiana	Identifying the aborectoristics of r	alumomiala	Lesson Application Deview	2 dava
Polynomial Functions	-identifying the characteristics of p	officient and	Lesson, Application, Review	2 days
	(including their degree, leading coe	enicient, and		
	constant)			
	even and odd degree polynomials	ices between		
	-Graphing polynomials			
Add Subtract Multiply	-Oraphing polynomials	and	Lesson Application Review	2 days
Polynomials	multiplication on sets of polynomia	als to simplify	Lesson, Application, Review	2 days
Factoring Polynomials	-Factoring polynomials completely	and solving	Lesson Application Review	3 days
r actornig r orynomiais	polynomials by factoring	and solving	Lesson, Application, Review	5 days
The Factor and	-Dividing polynomials using long	division and	Lesson Application Review	3 days
Remainder Theorems	synthetic division		Lesson, Application, Review	5 duys
	-Using the Remainder Theorem to	determine		
	function evaluation			
	-Using the Factor Theorem to iden	tifv factors of		
	each polynomial, and subsequently	, their zeros		
The Rational Zero	-Using the Rational Zero Theorem to create a list		Lesson, Application, Review	3 days
Theorem	of possible rational zeros		, II , III , IIII , III , IIII , III	
	-Applying the Factor Theorem to s	olve		
	polynomials for their rational zeros	5		
The Fundamental	-Applying the Fundamental Theore	em of Algebra	Lesson, Application, Review	3 days
Theorem of Algebra	to obtain all possible zeros for a pc	olynomial		
	-Using Descartes's Rule of Signs to	o determine		
	the number of positive and negativ	e zeros for		
	each polynomial			
Analyzing Graphs of	-Exploring relationships between z	eros, x-	Lesson, Application, Review	2 days
Polynomials	intercepts, factors, and solutions of polynomials			

Teacher Notes: 26 total days including assessment days (quizzes, test)					
Additional Resources:					
	Differen	ntiation/Modification St	rategies		
Students with	English Language	Gifted and Talented	Students at Risk	504 Students	
Disabilities	Learners	Students			
-Rephrase questions, directions, and explanations -Allow extended time on assessments -Consult with Case Managers and follow IEP modifications/accom modations	-Allow errors in speaking -Rephrase questions, directions, and explanations -Allow extended time on assessments	-Provide extension activities -Build on students' intrinsic motivations	-Consult with Guidance Counselors and follow I&RS procedures/action plans -Consult with classroom teacher(s) for specific behavior interventions -Provide extended time to complete tasks (on need basis)	-Rephrase questions, directions, and explanations -Allow extended time on assessments -Consult with Guidance Counselors and 504 Committees to come up with procedures/504 accommodations	

Unit #3 - Overview

Content Area: Algebra 2

Unit Title: Rational Exponents and Radical Functions

Grade Level: 10/11

Core Ideas: Students will work with the family of rational exponent and radical functions. The unit will cover the relationship between rational exponents and radicals, and will extend to the creation of new functions using the function operations and composition. Students will work with graphing square root and cube root functions as well as explore translations of the graphs. The concept of extraneous solutions will be covered when rational exponent and radical equations are solved.

Unit # 3 - Standards					
Standards (Content and Techr	nology):				
CPI#:	Statement:				
Performance Expectations (N	VJSLS)				
NJSLS.N-RN.A.1	Explain how the definition of the meaning of the rational exponents follows from extending				
	the properties of integer exponents to those values, allowing for a notation for radicals in				
	terms of rational exponents.				
NJSLS.N-RN.A.2	Rewrite expressions involving radicals and rational exponents using the properties of				
	exponents.				
NJSLS.F-BF.A.1b	Write a function that describes a relationship between two quantities.				
	b. Combine standard function types using arithmetic operations.				
NJSLS.F-BF.A.1c	Write a function that describes a relationship between two quantities.				
	c. (+) Compose functions.				
NJSLS.F-BF.B.4	Find inverse functions				
	a. Solve an equation of the form $f(x)=c$ for a simple function f that has an inverse and write				
	an expression for the inverse.				
	b. (+) Verify by composition that one function is the inverse of another				
	c. (+) Read values of an inverse function from graph or a table, given that the function has				
	an inverse				
	d. (+) Produce an invertible function from a non-invertible function by restricting the				
	domain.				
NJSLS.F-IF.C.7b	Graph functions expressed symbolically and show key features of the graph, by hand in				
	simple cases and using technology for more complicated cases.				
	b. Graph square root, cube root, and piecewise-defined functions, including step functions				
	and absolute value functions.				
NJSLS.A-REI.A.2	Solve simple rational and radical equations in one variable, and give examples showing				
	how extraneous solutions may arise.				
Mathematical Practices					
MP 1	Make sense of problems and persevere in solving them.				
MP 2	Reason abstractly and quantitatively.				
MP 3	Construct viable arguments and 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.				
Career Readiness, Life Litera	acies, and Key Skills				
9.2.12.CAP.5	Assess and modify a personal plan to support current interests and postsecondary plans.				
9.4.12.CI.1	Demonstrate the ability to reflect, analyze, and use creative skills and ideas				
9.4.12.CI.3	Investigate new challenges and opportunities for personal growth, advancement, and				
	transition				
9.4.12.TL.4	Collaborate in online learning communities or social networks or virtual worlds to				
	analyze and propose a resolution to a real-world problems				
Computer Science and Desig	n Thinking				
8.1.12.CS.2	Model interactions between application software, system software, and hardware				

8.2.12.ITH.3	Analyze the impact that globalization, social media, and access to open source
	technologies has had on innovation and on a society's economy, politics, and culture
8.2.12.EC.2	Assess the positive and negative impacts of emerging technologies on developing
	countries and evaluate how individuals, non-profit organizations, and governments have
	responded
Intercultural Statements (Am	nistad, Holocaust, LGBT, etc)
LGBTQ and Disabilities	Explore mathematicians in the LGBTQ and disabled community, including but not
NJSA 18A:35-4.35	limited to Juliette Bruce, NSF Postdoctoral Fellow at University of California, Berkeley
	and Stephen Hawking, former Director of Research at the University of Cambridge.
Amistad Law	Explore African-American mathematicians and scientists, including but not limited to
NJSA 18A:35-4.43	Martha Euphemia Lofton Haynes, the first African-American woman to earn a Ph.D in
	mathematics, and Elbert Frank Cox, the first African-American man to earn a Ph.D in
	mathematics in the world.
	Discuss and analyze the movie Hidden Figures, the story of female African-American
	mathematicians and engineers who worked for NASA
Holocaust Law	Explore Jewish mathematicians using the article "Jewish Mathematicians Who Changed
NJSA 18A:35-28	the Course of History" from jewishjournal.com
AAPI Law	Explore Asian-American and Pacific Islander mathematicians and scientists, including
NJSA 18A:25-4.44	but not limited to Dr. Peter Tsai, inventor of the N95 respirator and Diana Ma, data
	scientist and statistician for the Lakers
Companion Standards	
RST.9-10.7	Translate quantitative or technical information expressed in words in a text into visual
	form (e.g., a table or chart) and translate information expressed visually or
	mathematically (e.g., in an equation) into words
RST.11-12.7	Integrate and evaluate multiple sources of information presented in diverse formats and
	media (e.g., quantitative data, video, multimedia) in order to address a question or solve a
DOT 11 10 0	problem.
KS1.11-12.8	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text,
	verifying the data when possible and corroborating or challenging conclusions with other
BST 11 12 0	Sources of information.
K31.11-12.9	into a coherent understanding of a process, phenomenon, or concent, receiving
	conflicting information when possible
SL 11-12 /	Present information findings and supporting evidence clearly concisely and logically
SL.11-12.4	The content organization development and style are appropriate to task purpose and
	audience
Interdisciplinary Connection	
6 1 12 HistorySE 14 a	Explore the various ways women racial and ethnic minorities the LGBTO community
0.1.12.1115tory52.111.u	and individuals with disabilities have contributed to the American economy politics and
	society
6.1.12.HistorySE.14.b	Use a variety of sources from diverse perspective to analyze the social, economic and
y i i i i i i i i i i i i i i i i i i i	political contributions of marginalized and underrepresented groups and/or individuals.
CASEL 5 SEL Framework	
Self-Awareness	-Demonstrate honesty and integrity
	-Experience self-efficacy
	-Develop interests and a sense of purpose
Social Awareness	-Recognize strengths in others
	-Understand and express gratitude
Self-Management	-Identify and use stress management strategies
	-Exhibit self-discipline and self-motivation
	-Use planning and organizational skills
Relationship Skills	-Communicate effectively
	-Practice teamwork and collaborative problem-solving
	-Seek or offer support and help when needed

Responsible Decision-	-Demonstrate cu	riosity and op	en-mindedr	ness		
Making	-Learn to make a reasoned judgment after analyzing information, data, facts					
-Recognize how critical thinking skills are useful both inside & outside of school					hool	
• How can we use a rational exponent to represent			Unit Enduring Understandings:			
• How can we use a rational exponent to represent		Kati	onal exponents are equal			
a power involving a radical?			• Prop	berties of exponents		
• How can we use the	properties of exponents	to	• Extr	aneous solutions		
simplify products an	nd quotients of radicals?		• Inve	rses (Not all inverses are	functions.)
• How can we find th	e inverse of radical func	tions?	• Und	efined fractions (Denom	inator cann	ot be zero.)
• How can we solve r	adical equations?		• Frac	tion operations (Addition	1,	
• How are rational ex	ponent and radical function	tions	Subt	raction, Multiplication, I	Division)	
and their graphs sin are they different?	ailar to linear functions?	How	• Open	rations with polynomials		
• How can we identif	y the domain and range	of				
radical functions?						
		Evidence of	Learning			
Formative Assessments	: Do Now, Homework,	On-spot Chec	king for Un	derstanding, Teacher Fe	edback	
Summative/Benchmark	Assessment(s): Quizze	es, Chapter Re	views, Chaj	pter Tests		
Alternative Assessment	s: Portfolios, Online As	signments				
Resources/Materials:]	Key Vocab	ulary:		
https://njctl.org/courses/m	ath/algebra-ii/	1	nth roots, ra	tional exponents, compo	site function	ons, inverse
		t	functions, e	xtraneous solutions		
		Suggested Pa	cing Guide			
Lesson Name/Topic	Student Learning O	bjective(s)		Suggested Tasks/A	ctivities:	Day(s) to Complete
Nth Roots and Rational	-Converting between	rational expor	nents and	Lesson, Application	, Review	3 days
Exponents	radicals	-				
	-Evaluating rational e	xponents and	radicals			
Properties of Rational	-Simplifying rational	exponents and	l radical	Lesson, Application	, Review	3 days
Exponents	expressions	• • • •	1. 1			
	-Rationalizing the dei	nominator for	radical			
Function Operations and	-Creating new function	ne by adding	subtracting	Lesson Application	Review	3 days
Composite Functions	multiplying and divid	ing sets of fur	octions	, Lesson, Application	, Review	Juays
composite i uneuons	-Composing new fund	ctions	letions			
Inverse Functions	-Finding the inverse of	of a function b	y switching	Lesson, Application	, Review	3 days
	the domain and range					2
	-Verifying inverses b	y using the co	mposite			
	functions					
Square Root and Cube Root Functions	-Graphing square roo -Identifying domain a	-Graphing square root and cube root functions -Identifying domain and range of each function			, Review	2 days
Radical Equations	-Solving rational exp	onent equation	IS	Lesson, Application	, Review	3 days
	-Solving radical equations					
	-Checking for extrane	ous solutions				
Leacher Notes: 22 total Additional Decomposition	days including assessme	ent days (quizz	zes, test)			
Auditional Kesources:	Differen	tistion/Modi	fication St	•atorios		
Students with Disabilities	English Language Learners	Gifted and Stude	Talented nts	Students at Risk	504 \$	Students

-Rephrase questions,	-Allow errors in	-Provide extension	-Consult with	-Rephrase questions,
directions, and	speaking	activities	Guidance Counselors	directions, and
explanations	-Rephrase questions,	-Build on students'	and follow I&RS	explanations
-Allow extended time	directions, and	intrinsic motivations	procedures	-Allow extended time
on assessments	explanations		-Consult with	on assessments
-Consult with Case	-Allow extended time		classroom teacher(s)	-Consult with
Managers and follow	on assessments		for specific behavior	Guidance Counselors
IEP			interventions	and 504 Committees
modifications/accom			-Provide extended	to come up with
modations			time to complete tasks	procedures/504
			(on need basis)	accommodations

Unit #4 - Overview

Content Area: Algebra 2

Unit Title: Exponential and Logarithmic Functions

Grade Level: 10/11

Core Ideas: Students will work with the family of exponential and logarithmic functions. The unit will cover the inverse relationship between exponential and logarithmic functions. The properties of exponents are extended into the properties logarithms which will be used to condense and expand logarithmic expressions. Sets of data can be represented as either exponential or power functions. Students will determine whether an exponential or power function is more appropriate before writing the functions.

Unit # 4 - Standards					
Standards (Content and Technology):					
CPI#:	Statement:				
Performance Expectations (N	(JSLS)				
NJSLS.F-IF.C.7e	Graph functions expressed symbolically and show key features of the graph, by hand in				
	simple cases and using technology for more complicated cases.				
	e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and				
	trigonometric functions, showing period, midline, and amplitude				
NJSLS.F-BF.B.5 (+)	Use the inverse relationship between exponents and logarithms to solve problems involving				
	logarithms and exponents				
NJSLS.F-LE.A.4	Understand the inverse relationship between exponents and logarithms.				
NJSLS.F-LE.A.2	Construct linear and exponential functions, including arithmetic and geometric sequences,				
	given a graph, a description of a relationship, two input-output pairs (include reading these				
	from a table.)				
Mathematical Practices					
MP 1	Make sense of problems and persevere in solving them.				
MP 2	Reason abstractly and quantitatively.				
MP 3	Construct viable arguments and 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.				
Career Readiness, Life Litera	acies, and Key Skills				
9.1.12.CDM.8	Compare and compute interest and compound interest				
9.1.12.PB.6	Describe and calculate interest and fees that are applied to various forms of spending,				
	debt and saving				
9.2.12.CAP.5	Assess and modify a personal plan to support current interests and postsecondary plans.				
9.4.12.CI.1	Demonstrate the ability to reflect, analyze, and use creative skills and ideas				
9.4.12.CI.3	Investigate new challenges and opportunities for personal growth, advancement, and				
	transition				
9.4.12.TL.4	Collaborate in online learning communities or social networks or virtual worlds to				
	analyze and propose a resolution to a real-world problems				
Computer Science and Design	n Thinking				
8.1.12.CS.2	Model interactions between application software, system software, and hardware				
8.2.12.ITH.3	Analyze the impact that globalization, social media, and access to open source				
	technologies has had on innovation and on a society's economy, politics, and culture				
8.2.12.EC.2	Assess the positive and negative impacts of emerging technologies on developing				
	countries and evaluate how individuals, non-profit organizations, and governments have				
	responded				
Intercultural Statements (Am	nistad, Holocaust, LGBT, etc)				
LGBTQ and Disabilities	Explore mathematicians in the LGBTQ and disabled community, including but not				
NJSA 18A:35-4.35	limited to Juliette Bruce, NSF Postdoctoral Fellow at University of California. Berkelev				
	and Stephen Hawking, former Director of Research at the University of Cambridge.				

Amistad Law	Explore African-American ma	thematicians and scientists, including but not limited to			
NJSA 18A:35-4.43	Martha Euphemia Lofton Haynes, the first African-American woman to earn a Ph.D in				
	mathematics, and Elbert Frank	k Cox, the first African-American man to earn a Ph.D in			
	mathematics in the world.				
	Discuss and analyze the movie	e Hidden Figures, the story of female African-American			
	mathematicians and engineers	who worked for NASA			
Holocaust Law	Explore Jewish mathematicians using the article "Jewish Mathematicians Who Changed				
NJSA 18A:35-28	the Course of History" from jewishjournal.com				
AAPI Law	Explore Asian-American and I	Pacific Islander mathematicians and scientists, including			
NJSA 18A:25-4.44	but not limited to Dr. Peter Isai, inventor of the N95 respirator and Diana Ma, data				
Commence Star Star des de	scientist and statistician for the	e Lakers			
Companion Standards	Turnelate manufications and a lar	is disference the second in second in a first second in the second s			
RS1.9-10.7	form (a g a table or chart) and	translate information expressed in words in a text into visual			
	norm (e.g., a table or chart) and translate information expressed visually or				
PST 11 12 7	Integrate and evaluate multiple	action) into words			
K31.11-12.7	media (e.g. quantitative data)	video, multimedia) in order to address a question or solve a			
	problem	video, indifinicula) in order to address a question of solve a			
RST 11-12 8	Evaluate the hypotheses data	analysis and conclusions in a science or technical text			
N91.11 ⁻ 12.0	verifying the data when possib	le and corroborating or challenging conclusions with other			
	sources of information.	te and controloritating of chancinging conclusions with other			
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.				
SL.11-12.4	Present information, findings a	and supporting evidence clearly, concisely, and logically.			
	The content, organization, development, and style are appropriate to task, purpose and				
	audience.				
Interdisciplinary Connection	Interdisciplinary Connection				
6.1.12.HistorySE.14.a	Explore the various ways wom	nen, racial and ethnic minorities, the LGBTQ community,			
	and individuals with disabilitie	es have contributed to the American economy, politics and			
	society				
6.1.12.HistorySE.14.b	Use a variety of sources from diverse perspective to analyze the social, economic and				
	political contributions of marginalized and underrepresented groups and/or individuals.				
CASEL 5 SEL Framework					
Self-Awareness	-Demonstrate honesty and inte	grity			
	-Experience self-efficacy	C .			
	-Develop interests and a sense	of purpose			
Social Awareness	-Recognize strengths in others	ndo.			
Salf Management	-Olderstand and express grant				
Sell-Management	-Identify and use stress manage	f motivation			
	-Exhibit self-discipline and self	nal skills			
Relationshin Skills	-Ose plaining and organization				
Kelationship Skins	-Practice teamwork and collab	orative problem-solving			
	-Seek or offer support and helr	o when needed			
Responsible Decision-	-Demonstrate curiosity and on	en-mindedness			
Making	-Learn to make a reasoned jud	gment after analyzing information, data, facts			
C	-Recognize how critical thinking	ng skills are useful both inside & outside of school			
Unit Essential Question(s):		Unit Enduring Understandings:			
• How can exponential funct	ions be used to model real life	• Exponential form <-> Logarithmic form			
problems?		• Exponential and logarithmic graph translations			
• What are some characterist					
	ics of exponential and	• Natural base eand natural logarithm <i>In</i>			
logarithmic functions?	ics of exponential and	 Natural base <i>e</i> and natural logarithm <i>ln</i> Logarithm evaluations 			
logarithmic functions?	ics of exponential and	 Natural base <i>e</i> and natural logarithm <i>ln</i> Logarithm evaluations Logarithm graphs 			

 What is the relationship between exponential and logarithmic functions? What is the natural base? 		 Exponer Compour interest 	ntial growth and decay models and interest and continuously con- models	npounded
• How can the propertie	es of exponents be used to derive	Abstract	and quantitative reasoning	
the properties of logar	rithms?			
• How can we solve exp	ponential and logarithmic			
• How do we determine	whether a set of data fits on			
• How do we determine exponential pattern or	a power pattern?			
	a power pattern?			
	Fyidoneo	of Loorning		
Formative Assessments:	Do Now Homework On-spot Ch	ecking for Unde	rstanding Teacher Feedback	
Summative/Benchmark Alternative Assessments	Assessment(s): Quizzes, Chapter F : Portfolios, Online Assignments	Reviews, Chapte	r Tests	
Resources/Materials:		Key Vocabula	ary:	
https://njctl.org/courses/ma	ath/algebra-ii/	exponential gr	owth/decay, compound interest,	horizonal
		asymptote, log	garithm, natural base	
	Suggested P	acing Guide		
Lesson Name/ I opic	Student Learning Objective(s)		Suggested Tasks/Activities:	Day(s) to Complete
Exponential Growth and	-Graphing exponential growth an	d decay	Lesson, Application, Review	3 days
Decay	functions			
	life problems	nodels to real-		
	-Applying the compound interest	formula to		
	real-life problems			
Natural Base e	-Simplifying natural base express	ions	Lesson, Application, Review	2 days
	-Evaluating natural base expression	ons		
	exponential functions	un naturai base		
	-Graphing natural base exponential functions			
Logarithms	-Converting between exponential	and	Lesson, Application, Review	3 days
	logarithmic forms			
	-Evaluating logarithms with and v	without a		
	-Finding inverses of logarithmic t	functions		
	-Graphing logarithmic functions	unetions		
Properties of	-Condensing expressions using th	e properties of	Lesson, Application, Review	3 days
Logarithms	logarithms			
	-Expanding expressions using the	properties of		
Exponential and	-Solving exponential equations		Lesson, Application, Review	3 days
Logarithmic Equations	-Solving logarithmic equations			
	-Checking for extraneous solution	18		
Exponential and Power	-Checking whether sets of data fit	t an	Lesson, Application, Review	3 days
Functions	exponential or power function	unations airran		
	a set of points	uncuons given		
Teacher Notes: 22 total d	lays including assessment days (au	zzes, test)	1	1
Additional Resources:		,,		

Students with	English Language	Gifted and Talented	Students at Risk	504 Students
Disabilities	Learners	Students		
-Rephrase questions, directions, and explanations -Allow extended time on assessments -Consult with Case Managers and follow IEP modifications and accommodations	-Allow errors in speaking -Rephrase questions, directions, and explanations -Allow extended time on assessments	-Provide extension activities -Build on students' intrinsic motivations	-Consult with Guidance Counselors and follow I&RS procedures/action plans -Consult with classroom teacher(s) for specific behavior interventions	-Rephrase questions, directions, and explanations -Allow extended time on assessments -Consult with Guidance Counselors and 504 Committees to come up with
			-Provide extended	procedures/504
			time to complete tasks	accommodations
			(on need basis)	

Unit # 5 - Overview

Content Area: Algebra 2

Unit Title: Rational Functions **Grade Level:** 10/11

Core Ideas: Students will work with the family of rational functions. Rational functions are introduced using inverse and joint variation. The unit will cover the relationship between the graph of rational functions and their characteristics (domain, range, holes, asymptotes). Students will also explore how fraction operations are extended to add, subtract, multiply, and divide rational functions. Rational equations will be solved using skills from Algebra 1 (cross-products, and LCD).

Unit # - Standards					
Standards (Content and Technology):					
CPI#:	Statement:				
Performance Expectations (N	JSLS)				
NJSLS.A-CED.A.2	Create equations in two or more variables to represent relationships between quantities;				
	graph equations on coordinate axes with labels and scales.				
NJSLS.F-IF-C.7d (+)	Graph functions expressed symbolically and show key features of the graph, by hand in				
	simple cases and using technology for more complicated cases				
	d. Graph rational functions, identifying zeros and asymptotes when suitable factorizations				
	are available, and showing end behavior				
NJSLS.A-APR.D.7 (+)	Understand that rational expressions form a system analogous to the rational numbers,				
	closed under addition, subtraction, multiplication, and division by a nonzero rational				
	expression; add, subtract, multiply, and divide rational expressions.				
NJSLS.A-REI.A.2	Solve simple rational and radical equations in one variable, and give examples showing				
	how extraneous solutions may arise.				
NJSLS.F-IF.C.9	Compare properties of two functions each represented in a different way (algebraically,				
	graphically, numerically in tables, or by verbal descriptions).				
Mathematical Practices					
MP 1	Make sense of problems and persevere in solving them.				
MP 2	Reason abstractly and quantitatively.				
MP 3	Construct viable arguments and 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.				
Career Readiness, Life Litera	acies, and Key Skills				
9.2.12.CAP.5	Assess and modify a personal plan to support current interests and postsecondary plans.				
9.4.12.CI.1	Demonstrate the ability to reflect, analyze, and use creative skills and ideas				
9.4.12.CI.3	Investigate new challenges and opportunities for personal growth, advancement, and				
	transition				
9.4.12.TL.4	Collaborate in online learning communities or social networks or virtual worlds to				
	analyze and propose a resolution to a real-world problems				
Computer Science and Design	n Thinking				
8.1.12.CS.2	Model interactions between application software, system software, and hardware				
8.2.12.ITH.3	Analyze the impact that globalization, social media, and access to open source				
	technologies has had on innovation and on a society's economy, politics, and culture				
8.2.12.EC.2	Assess the positive and negative impacts of emerging technologies on developing				
	countries and evaluate how individuals, non-profit organizations, and governments have				
	responded				
Intercultural Statements (Am	nistad, Holocaust, LGBT, etc)				
LGBTQ and Disabilities	Explore mathematicians in the LGBTQ and disabled community, including but not				
NJSA 18A:35-4.35	limited to Juliette Bruce, NSF Postdoctoral Fellow at University of California, Berkeley				
	and Stephen Hawking, former Director of Research at the University of Cambridge.				

Amistad Law	Explore African-American ma	thematicians and scientists, including but not limited to			
NISA 18A:35-4 43	Martha Euphemia Lofton Havnes the first African-American woman to earn a Ph D in				
	mathematics and Elbert Frank	Cox the first African-American man to earn a Ph D in			
	mathematics in the world				
	Discuss and analyze the movie	Hidden Figures the story of female African-American			
	mathematicians and engineers	who worked for NASA			
Holocoust Law	Explore Jowish mathematician	who worked for MASA			
NICA 19A.25 29	the Course of History" from is	s using the article <i>Jewish Mathematicians who Changea</i>			
NJSA 18A:55-28	Ine Course of History Hom jewishjournal.com				
AAPI Law	Explore Asian-American and F	actific Islander mathematicians and scientists, including			
NJSA 18A:25-4.44	but not limited to Dr. Peter I sai, inventor of the N95 respirator and Diana Ma, data				
	scientist and statistician for the	Lakers			
Companion Standards					
RST.9-10.7	Translate quantitative or techni	ical information expressed in words in a text into visual			
	form (e.g., a table or chart) and translate information expressed visually or				
	mathematically (e.g., in an equ	ation) into words			
RST.11-12.7	Integrate and evaluate multiple	sources of information presented in diverse formats and			
	media (e.g., quantitative data,	video, multimedia) in order to address a question or solve a			
	problem.				
RST.11-12.8	Evaluate the hypotheses, data,	analysis, and conclusions in a science or technical text,			
	verifying the data when possib	le and corroborating or challenging conclusions with other			
	sources of information.				
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				
SI 11 12 /	Present information findings and supporting evidence clearly concisely and logically				
SL.11-12.4	The content organization day	alopmont, and style are appropriate to task, purpose and			
	audience				
	audiciice.				
Intendigainlinen Connection					
Interdisciplinary Connection	Evelore the corious more more	en regist and other is using aritics, the LCDTO community			
Interdisciplinary Connection 6.1.12.HistorySE.14.a	Explore the various ways wom	en, racial and ethnic minorities, the LGBTQ community,			
Interdisciplinary Connection 6.1.12.HistorySE.14.a	Explore the various ways wom and individuals with disabilitie	en, racial and ethnic minorities, the LGBTQ community, s have contributed to the American economy, politics and			
Interdisciplinary Connection 6.1.12.HistorySE.14.a	Explore the various ways wom and individuals with disabilitie society	en, racial and ethnic minorities, the LGBTQ community, s have contributed to the American economy, politics and			
Interdisciplinary Connection 6.1.12.HistorySE.14.a 6.1.12.HistorySE.14.b	Explore the various ways wom and individuals with disabilitie society Use a variety of sources from c	en, racial and ethnic minorities, the LGBTQ community, s have contributed to the American economy, politics and liverse perspective to analyze the social, economic and			
Interdisciplinary Connection 6.1.12.HistorySE.14.a 6.1.12.HistorySE.14.b	Explore the various ways wom and individuals with disabilitie society Use a variety of sources from of political contributions of marg	en, racial and ethnic minorities, the LGBTQ community, s have contributed to the American economy, politics and liverse perspective to analyze the social, economic and inalized and underrepresented groups and/or individuals.			
Interdisciplinary Connection 6.1.12.HistorySE.14.a 6.1.12.HistorySE.14.b CASEL 5 SEL Framework	Explore the various ways wom and individuals with disabilitie society Use a variety of sources from a political contributions of marg	en, racial and ethnic minorities, the LGBTQ community, s have contributed to the American economy, politics and liverse perspective to analyze the social, economic and inalized and underrepresented groups and/or individuals.			
Interdisciplinary Connection 6.1.12.HistorySE.14.a 6.1.12.HistorySE.14.b CASEL 5 SEL Framework Self-Awareness	Explore the various ways wom and individuals with disabilitie society Use a variety of sources from a political contributions of marg -Demonstrate honesty and inte	en, racial and ethnic minorities, the LGBTQ community, s have contributed to the American economy, politics and liverse perspective to analyze the social, economic and inalized and underrepresented groups and/or individuals. grity			
Interdisciplinary Connection 6.1.12.HistorySE.14.a 6.1.12.HistorySE.14.b CASEL 5 SEL Framework Self-Awareness	Explore the various ways wom and individuals with disabilitie society Use a variety of sources from of political contributions of marg -Demonstrate honesty and inte -Experience self-efficacy	en, racial and ethnic minorities, the LGBTQ community, s have contributed to the American economy, politics and liverse perspective to analyze the social, economic and inalized and underrepresented groups and/or individuals. grity			
Interdisciplinary Connection 6.1.12.HistorySE.14.a 6.1.12.HistorySE.14.b CASEL 5 SEL Framework Self-Awareness	Explore the various ways wom and individuals with disabilitie society Use a variety of sources from of political contributions of marg -Demonstrate honesty and inte -Experience self-efficacy -Develop interests and a sense	en, racial and ethnic minorities, the LGBTQ community, s have contributed to the American economy, politics and liverse perspective to analyze the social, economic and inalized and underrepresented groups and/or individuals. grity of purpose			
Interdisciplinary Connection 6.1.12.HistorySE.14.a 6.1.12.HistorySE.14.b CASEL 5 SEL Framework Self-Awareness Social Awareness	Explore the various ways wom and individuals with disabilitie society Use a variety of sources from of political contributions of marg -Demonstrate honesty and inte -Experience self-efficacy -Develop interests and a sense -Recognize strengths in others	en, racial and ethnic minorities, the LGBTQ community, s have contributed to the American economy, politics and liverse perspective to analyze the social, economic and inalized and underrepresented groups and/or individuals. grity of purpose			
Interdisciplinary Connection 6.1.12.HistorySE.14.a 6.1.12.HistorySE.14.b CASEL 5 SEL Framework Self-Awareness Social Awareness	Explore the various ways wom and individuals with disabilitie society Use a variety of sources from of political contributions of marg -Demonstrate honesty and inte -Experience self-efficacy -Develop interests and a sense -Recognize strengths in others -Understand and express gratit	en, racial and ethnic minorities, the LGBTQ community, s have contributed to the American economy, politics and liverse perspective to analyze the social, economic and inalized and underrepresented groups and/or individuals. grity of purpose ude			
Interdisciplinary Connection 6.1.12.HistorySE.14.a 6.1.12.HistorySE.14.b CASEL 5 SEL Framework Self-Awareness Social Awareness Self-Management	Explore the various ways wom and individuals with disabilitie society Use a variety of sources from of political contributions of marg -Demonstrate honesty and inte -Experience self-efficacy -Develop interests and a sense -Recognize strengths in others -Understand and express gratit -Identify and use stress manage	en, racial and ethnic minorities, the LGBTQ community, s have contributed to the American economy, politics and liverse perspective to analyze the social, economic and inalized and underrepresented groups and/or individuals. grity of purpose ude ement strategies			
Interdisciplinary Connection 6.1.12.HistorySE.14.a 6.1.12.HistorySE.14.b CASEL 5 SEL Framework Self-Awareness Social Awareness Self-Management	Explore the various ways wom and individuals with disabilitie society Use a variety of sources from of political contributions of marg -Demonstrate honesty and inte -Experience self-efficacy -Develop interests and a sense -Recognize strengths in others -Understand and express gratit -Identify and use stress manag -Exhibit self-discipline and sel	en, racial and ethnic minorities, the LGBTQ community, s have contributed to the American economy, politics and liverse perspective to analyze the social, economic and inalized and underrepresented groups and/or individuals. grity of purpose ude ement strategies f-motivation			
Interdisciplinary Connection 6.1.12.HistorySE.14.a 6.1.12.HistorySE.14.b CASEL 5 SEL Framework Self-Awareness Social Awareness Self-Management	Explore the various ways wom and individuals with disabilitie society Use a variety of sources from of political contributions of marg -Demonstrate honesty and inte -Experience self-efficacy -Develop interests and a sense -Recognize strengths in others -Understand and express gratit -Identify and use stress manage -Exhibit self-discipline and sel -Use planning and organization	en, racial and ethnic minorities, the LGBTQ community, s have contributed to the American economy, politics and liverse perspective to analyze the social, economic and inalized and underrepresented groups and/or individuals. grity of purpose ude ement strategies f-motivation nal skills			
Interdisciplinary Connection 6.1.12.HistorySE.14.a 6.1.12.HistorySE.14.b CASEL 5 SEL Framework Self-Awareness Social Awareness Self-Management Relationship Skills	Explore the various ways wom and individuals with disabilitie society Use a variety of sources from of political contributions of marg -Demonstrate honesty and inte -Experience self-efficacy -Develop interests and a sense -Recognize strengths in others -Understand and express gratit -Identify and use stress manage -Exhibit self-discipline and sel -Use planning and organization -Communicate effectively	en, racial and ethnic minorities, the LGBTQ community, s have contributed to the American economy, politics and liverse perspective to analyze the social, economic and inalized and underrepresented groups and/or individuals. grity of purpose ude ement strategies f-motivation nal skills			
Interdisciplinary Connection 6.1.12.HistorySE.14.a 6.1.12.HistorySE.14.b CASEL 5 SEL Framework Self-Awareness Social Awareness Self-Management Relationship Skills	Explore the various ways wom and individuals with disabilitie society Use a variety of sources from of political contributions of marg -Demonstrate honesty and inte -Experience self-efficacy -Develop interests and a sense -Recognize strengths in others -Understand and express gratit -Identify and use stress manage -Exhibit self-discipline and sel -Use planning and organization -Communicate effectively -Practice teamwork and collaboration	en, racial and ethnic minorities, the LGBTQ community, s have contributed to the American economy, politics and liverse perspective to analyze the social, economic and inalized and underrepresented groups and/or individuals. grity of purpose ude ement strategies f-motivation hal skills			
Interdisciplinary Connection 6.1.12.HistorySE.14.a 6.1.12.HistorySE.14.b CASEL 5 SEL Framework Self-Awareness Social Awareness Self-Management Relationship Skills	Explore the various ways wom and individuals with disabilitie society Use a variety of sources from of political contributions of marg -Demonstrate honesty and inte -Experience self-efficacy -Develop interests and a sense -Recognize strengths in others -Understand and express gratit -Identify and use stress manage -Exhibit self-discipline and sel -Use planning and organization -Communicate effectively -Practice teamwork and collabo -Seek or offer support and helr	en, racial and ethnic minorities, the LGBTQ community, s have contributed to the American economy, politics and diverse perspective to analyze the social, economic and inalized and underrepresented groups and/or individuals. grity of purpose ude ement strategies f-motivation nal skills prative problem-solving o when needed			
Interdisciplinary Connection 6.1.12.HistorySE.14.a 6.1.12.HistorySE.14.b CASEL 5 SEL Framework Self-Awareness Social Awareness Self-Management Relationship Skills Responsible Decision-	Explore the various ways wom and individuals with disabilitie society Use a variety of sources from of political contributions of marg -Demonstrate honesty and inte -Experience self-efficacy -Develop interests and a sense -Recognize strengths in others -Understand and express gratit -Identify and use stress manage -Exhibit self-discipline and sel -Use planning and organization -Communicate effectively -Practice teamwork and collabe -Seek or offer support and help -Demonstrate curiosity and organization	en, racial and ethnic minorities, the LGBTQ community, s have contributed to the American economy, politics and liverse perspective to analyze the social, economic and inalized and underrepresented groups and/or individuals. grity of purpose ude ement strategies f-motivation nal skills prative problem-solving o when needed en-mindedness			
Interdisciplinary Connection 6.1.12.HistorySE.14.a 6.1.12.HistorySE.14.b CASEL 5 SEL Framework Self-Awareness Social Awareness Self-Management Relationship Skills Responsible Decision- Making	Explore the various ways wom and individuals with disabilitie society Use a variety of sources from of political contributions of marg -Demonstrate honesty and inte -Experience self-efficacy -Develop interests and a sense -Recognize strengths in others -Understand and express gratit -Identify and use stress manage -Exhibit self-discipline and sel -Use planning and organization -Communicate effectively -Practice teamwork and collabo -Seek or offer support and help -Demonstrate curiosity and ope -Learn to make a reasoned inde	en, racial and ethnic minorities, the LGBTQ community, s have contributed to the American economy, politics and liverse perspective to analyze the social, economic and inalized and underrepresented groups and/or individuals. grity of purpose ude ement strategies f-motivation nal skills prative problem-solving o when needed en-mindedness gment after analyzing information, data, facts			
Interdisciplinary Connection 6.1.12.HistorySE.14.a 6.1.12.HistorySE.14.b CASEL 5 SEL Framework Self-Awareness Social Awareness Self-Management Relationship Skills Responsible Decision-Making	Explore the various ways wom and individuals with disabilitie society Use a variety of sources from of political contributions of marg -Demonstrate honesty and inte -Experience self-efficacy -Develop interests and a sense -Recognize strengths in others -Understand and express gratit -Identify and use stress manage -Exhibit self-discipline and sel -Use planning and organization -Communicate effectively -Practice teamwork and collabe -Seek or offer support and help -Demonstrate curiosity and ope -Learn to make a reasoned judg	en, racial and ethnic minorities, the LGBTQ community, s have contributed to the American economy, politics and liverse perspective to analyze the social, economic and inalized and underrepresented groups and/or individuals. grity of purpose ude ement strategies f-motivation hal skills orative problem-solving o when needed en-mindedness gment after analyzing information, data, facts ag skills are useful both inside & outside of school			
Interdisciplinary Connection 6.1.12.HistorySE.14.a 6.1.12.HistorySE.14.b CASEL 5 SEL Framework Self-Awareness Social Awareness Self-Management Relationship Skills Responsible Decision-Making Unit Essential Original (a)	Explore the various ways wom and individuals with disabilitie society Use a variety of sources from of political contributions of marg -Demonstrate honesty and inte -Experience self-efficacy -Develop interests and a sense -Recognize strengths in others -Understand and express gratit -Identify and use stress manage -Exhibit self-discipline and sel -Use planning and organization -Communicate effectively -Practice teamwork and collabe -Seek or offer support and help -Demonstrate curiosity and op -Learn to make a reasoned jud -Recognize how critical thinkin	en, racial and ethnic minorities, the LGBTQ community, s have contributed to the American economy, politics and liverse perspective to analyze the social, economic and inalized and underrepresented groups and/or individuals. grity of purpose ude ement strategies f-motivation hal skills orative problem-solving o when needed en-mindedness gment after analyzing information, data, facts hg skills are useful both inside & outside of school			
Interdisciplinary Connection 6.1.12.HistorySE.14.a 6.1.12.HistorySE.14.b CASEL 5 SEL Framework Self-Awareness Social Awareness Self-Management Relationship Skills Responsible Decision- Making Unit Essential Question(s): • How on rational function	Explore the various ways wom and individuals with disabilitie society Use a variety of sources from of political contributions of marg -Demonstrate honesty and inte -Experience self-efficacy -Develop interests and a sense -Recognize strengths in others -Understand and express gratit -Identify and use stress manage -Exhibit self-discipline and sel -Use planning and organization -Communicate effectively -Practice teamwork and collabo -Seek or offer support and help -Demonstrate curiosity and ope -Learn to make a reasoned judg -Recognize how critical thinking	en, racial and ethnic minorities, the LGBTQ community, s have contributed to the American economy, politics and liverse perspective to analyze the social, economic and inalized and underrepresented groups and/or individuals. grity of purpose ude ement strategies f-motivation nal skills orative problem-solving o when needed en-mindedness gment after analyzing information, data, facts ng skills are useful both inside & outside of school Unit Enduring Understandings:			
Interdisciplinary Connection 6.1.12.HistorySE.14.a 6.1.12.HistorySE.14.b CASEL 5 SEL Framework Self-Awareness Social Awareness Self-Management Relationship Skills Responsible Decision- Making Unit Essential Question(s): • How can rational functions	Explore the various ways wom and individuals with disabilitie society Use a variety of sources from of political contributions of marg -Demonstrate honesty and inte -Experience self-efficacy -Develop interests and a sense -Recognize strengths in others -Understand and express gratit -Identify and use stress manage -Exhibit self-discipline and sel -Use planning and organization -Communicate effectively -Practice teamwork and collabo -Seek or offer support and help -Demonstrate curiosity and op -Learn to make a reasoned judg -Recognize how critical thinking be used to model real-life	en, racial and ethnic minorities, the LGBTQ community, s have contributed to the American economy, politics and liverse perspective to analyze the social, economic and inalized and underrepresented groups and/or individuals. grity of purpose ude ement strategies f-motivation hal skills orative problem-solving o when needed en-mindedness gment after analyzing information, data, facts hg skills are useful both inside & outside of school Unit Enduring Understandings: • Direct variation vs. Inverse variation			
Interdisciplinary Connection 6.1.12.HistorySE.14.a 6.1.12.HistorySE.14.b CASEL 5 SEL Framework Self-Awareness Social Awareness Self-Management Relationship Skills Responsible Decision-Making Unit Essential Question(s): • How can rational functions problems?	Explore the various ways wom and individuals with disabilitie society Use a variety of sources from of political contributions of marg -Demonstrate honesty and inte -Experience self-efficacy -Develop interests and a sense -Recognize strengths in others -Understand and express gratit -Identify and use stress manage -Exhibit self-discipline and sel -Use planning and organization -Communicate effectively -Practice teamwork and collabe -Seek or offer support and help -Demonstrate curiosity and ope -Learn to make a reasoned judg -Recognize how critical thinking be used to model real-life	en, racial and ethnic minorities, the LGBTQ community, s have contributed to the American economy, politics and liverse perspective to analyze the social, economic and inalized and underrepresented groups and/or individuals. grity of purpose ude ement strategies f-motivation hal skills prative problem-solving o when needed en-mindedness gment after analyzing information, data, facts hg skills are useful both inside & outside of school Unit Enduring Understandings: • Direct variation vs. Inverse variation • Fraction operations (addition, subtraction,			
Interdisciplinary Connection 6.1.12.HistorySE.14.a 6.1.12.HistorySE.14.b CASEL 5 SEL Framework Self-Awareness Social Awareness Social Awareness Self-Management Relationship Skills Responsible Decision- Making Unit Essential Question(s): • How can rational functions problems? • How are inverse variation a	Explore the various ways wom and individuals with disabilitie society Use a variety of sources from of political contributions of marg -Demonstrate honesty and inte -Experience self-efficacy -Develop interests and a sense -Recognize strengths in others -Understand and express gratit -Identify and use stress manage -Exhibit self-discipline and sel -Use planning and organization -Communicate effectively -Practice teamwork and collabe -Seek or offer support and help -Demonstrate curiosity and ope -Learn to make a reasoned judg -Recognize how critical thinking be used to model real-life and rational functions related?	en, racial and ethnic minorities, the LGBTQ community, s have contributed to the American economy, politics and liverse perspective to analyze the social, economic and inalized and underrepresented groups and/or individuals. grity of purpose ude ement strategies f-motivation nal skills orative problem-solving o when needed en-mindedness gment after analyzing information, data, facts ng skills are useful both inside & outside of school Unit Enduring Understandings: • Direct variation vs. Inverse variation • Fraction operations (addition, subtraction, multiplication, division)			

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functions signify?

Local and global behaviors of rational functions

 How do we determine function? How can a rational How are rational functions? How do we compare rational functions? Formative Assessment Summative/Benchmare Alternative Assessment 	ne excluded values in a r function be solved? nctions graphed? asic operations applied to the different characteris ts: Do Now, Homework, tk Assessment(s): Quizzents: Portfolios, Online As	rational rational stics of Evidence of I On-spot Checl es, Chapter Rev signments	 Trans Doma Learning king for Un views, Chap 	lations of functions (y = ain, range, holes, asympt derstanding, Teacher Fe pter Tests	$=\frac{a}{x-h}+k$) otes	
Resources/Materials:		I	Key Vocab	ulary:		
https://njctl.org/courses/	math/algebra-ii/	F	Rational fui	nctions, direct variation,	inverse var	iation, joint
		V	variation, sl	ant asymptotes, vertical	asymptotes	s, holes,
		e	excluded va	lues		
		Suggested Pac	ing Guide			
Lesson Name/Topic Student Learning Objective(s)				Suggested Tasks/A	ctivities:	Day(s) to
Inverse and Joint	-Solve direct invers	Solve direct inverse joint variation problems			Review	2 days
Variation	-Use the comparisor	-Use the comparison of two or more units to			i, ite vie w	2 days
	determine inverse an	determine inverse and joint variation				
Rational Function Grap	Rational Function Graphs -Graph simple rational functions			Lesson, Application	, Review	3 days
-Graph translations of rational fu			ctions			
-Identify domain, range, holes, and asymptote			es l			
Multiply and Divide	-Apply fraction open	-Apply fraction operations to simplify rational			i, Review	3 days
Rational Functions expression multiplication and division Add and Subtract Amply fraction operations to simplify ration			1011 lify rational	1 Lasson Application	Douriouv	2 dava
Rational Functions	expression addition	and subtraction	n rationa	Lesson, Application	I, KEVIEW	Juays
Rational Equations	-Solve rational equa	tions using cro	ss-products	s Lesson. Application	n. Review	3 days
	and LCD		r		-,	
	-Check for extraneo	us solutions				
Function Characteristic	s -Determine whether	a function is in	ncreasing o	r Lesson, Application	n, Review	2 days
	decreasing over an i	nterval				
	-Determine whether	functions are e	even or odd			
Teacher Notes: 21 tota	-Compare functions	ent days (quizz	es test)			
Additional Resources:	i days meruding assessing	ent days (quizz	<i>cs</i> , <i>cs</i>)			
	Differen	ntiation/Modif	fication Stu	rategies		
Students with	English Language	Gifted and 7	Falented	Students at Risk	504 \$	Students
Disabilities	Learners	Studer	nts			
-Rephrase questions.	-Allow errors in	-Provide exte	nsion	-Consult with	-Rephras	e questions.
directions, and	speaking	activities		Guidance Counselors	direction	s, and
explanations	-Rephrase questions,	-Build on stu	dents'	and follow I&RS	explanati	ons
-Allow extended time	directions, and	intrinsic moti	vations	procedures/action	-Allow ex	xtended time
on assessments	explanations			plans	on assess	ments
-Consult with Case	-Allow extended time			-Consult with	-Consult	With
IFP	on assessments			for specific behavior	and 504 (Counselors
				interventions and 504 Committees		

modifications/accom		-Provide extended	procedures/504
modations		time to complete tasks	accommodations
		(on need basis)	

Unit # 6 - Overview

Content Area: Algebra 2

Unit Title: Probability **Grade Level:** 10/11

Core Ideas: Students will work on probability and odds of simple events. The unit will cover the differences between mutually exclusive and inclusive events, and independent and dependent events. Students will calculate the probabilities of events, using the Addition Rule or the Multiplication Rule depending on the type of event. Throughout the unit, students will work on finding permutations and combinations, a large part in calculating probability where both are a measure of finding groups of *r*objects out of *n*. With permutations, the order in which objects are picked determine a different outcome. With combinations, the order in which objects are picked do not matter.

Unit # 6 - Standards

Standards (Content and Technology):						
CPI#: Statement:						
Performance Expectations (NJSLS)						
NJSLS.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")					
NJSLS.S-CP.B.9 (+)	Use permutation and combinations to compute probabilities of compound events and solve					
	problems					
NJSLS.S-CP.A.2	Understand that two events A and B are independent if the probability of A and B occurring					
	is the product of their probabilities, and use this characterization to determine if they are					
	independent					
NJSLS.S-CP.A.3	Understand that the condition probability of A given B as $P(A \text{ and } B) P(B)$, and interpret					
	independence of A and B 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					
NJSLS.S-CP.B.7	Apple the Addition Rule, $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$, and interpret the answer					
	in terms of the model.					
NJSLS.S-CP.B.8 (+)	Appy the general Multiplication Rule in a uniform probability model, $P(A \text{ and } B) = P(A)$					
	* P(B A) = P(B) * P(A B)					
Mathematical Practices						
MP 1	Make sense of problems and persevere in solving them.					
MP 2	Reason abstractly and quantitatively.					
MP 3	Construct viable arguments and 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.					
Career Readiness, Life Litera	cies, and Key Skills					
9.2.12.CAP.5	Assess and modify a personal plan to support current interests and postsecondary plans.					
9.4.12.CI.1	Demonstrate the ability to reflect, analyze, and use creative skills and ideas					
9.4.12.CI.3	Investigate new challenges and opportunities for personal growth, advancement, and					
	transition					
9.4.12.TL.4	Collaborate in online learning communities or social networks or virtual worlds to					
	analyze and propose a resolution to a real-world problems					
Computer Science and Design	n Thinking					
8.1.12.CS.2	Model interactions between application software, system software, and hardware					
8.2.12.ITH.3	Analyze the impact that globalization, social media, and access to open source					
	technologies has had on innovation and on a society's economy, politics, and culture					
8.2.12.EC.2	Assess the positive and negative impacts of emerging technologies on developing					
	countries and evaluate how individuals, non-profit organizations, and governments have					
	responded					
Intercultural Statements (Am	nistad, Holocaust, LGBT, etc)					

LGBTQ and Disabilities	Explore mathematicians in the	LGBTQ and disabled community, including but not			
NJSA 18A:35-4.35	limited to Juliette Bruce, NSF Postdoctoral Fellow at University of California, Berkeley				
	and Stephen Hawking, former	Director of Research at the University of Cambridge.			
Amistad Law	Explore African-American ma	thematicians and scientists, including but not limited to			
NJSA 18A:35-4.43	Martha Euphemia Lotton Hay	nes, the first African-American woman to earn a Ph.D in			
	mathematics, and Elbert Frank	Cox, the first African-American man to earn a Ph.D in			
	Discuss and analyze the movie	Hiddon Figures, the story of female African American			
	mathematicians and engineers	who worked for NASA			
Holocaust Law	Explore Jewish mathematician	as using the article "Jewish Mathematicians Who Changed			
NJSA 18A:35-28	the Course of History" from jewishjournal.com				
AAPI Law	Explore Asian-American and I	Pacific Islander mathematicians and scientists, including			
NJSA 18A:25-4.44	but not limited to Dr. Peter 1sa	ai, inventor of the N95 respirator and Diana Ma, data			
Companies Standarda	scientist and statistician for the	e Lakers			
Companion Standards	Translata quantitativa or tashn	ical information approach in words in a tart into viewal			
K51.9-10.7	form (a g a table or chart) and	translate information expressed in words in a text into visual			
	mathematically (e.g., in an equ	ation) into words			
RST 11-12 7	Integrate and evaluate multiple	action mit words			
K51.11 ⁻¹ 2.7	media (e.g. quantitative data	video multimedia) in order to address a question or solve a			
	problem.	video, indianceda) in order to address a question of solve a			
RST.11-12.8	Evaluate the hypotheses, data,	analysis, and conclusions in a science or technical text,			
	verifying the data when possible and corroborating or challenging conclusions with other				
	sources of information.				
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.				
SL.11-12.4	Present information, findings a	and supporting evidence clearly, concisely, and logically.			
	The content, organization, dev	elopment, and style are appropriate to task, purpose and			
	audience.				
Interdisciplinary Connection					
6.1.12.HistorySE.14.a	Explore the various ways wor	en, racial and ethnic minorities, the LGBTQ community,			
	society	is have contributed to the American economy, pointics and			
6 1 12 HistorySE 14 h	Use a variety of sources from (liverse perspective to analyze the social economic and			
0.1.12.1115tory51.14.0	political contributions of marg	inalized and underrepresented groups and/or individuals.			
CASEL 5 SEL Framework	pointear controlations of marg	mailled and enderrepresented groups and or mar radaist			
Self-Awareness	-Demonstrate honesty and inte	grity			
	-Experience self-efficacy				
	-Develop interests and a sense	of purpose			
Social Awareness	-Recognize strengths in others				
	-Understand and express gratit	ude			
Self-Management	-Identify and use stress manage	ement strategies			
	-Exhibit self-discipline and sel	f-motivation			
	-Use planning and organization	nal skills			
Relationship Skills	-Communicate effectively				
	-Practice teamwork and collab	orative problem-solving			
Deerensikle Deele'	-Seek or otter support and help	o when needed			
Responsible Decision-	-Demonstrate curiosity and op	en-mindedness			
	-Learn to make a reasoned Jud	gnient aller analyzing information, data, facts			
Unit Essential Question(s).		Unit Enduring Understandings.			
 How can we list the possil 	ble outcomes in the	 Counting Principle of Multiplication 			
sample space of an experi	ment?	Permutations			
How can we determine wi	hether two events	Combinations			
 How can we determine with 					

 are independent or How can we find p overlapping events How can a tree dia of ways in which t How can we detern of an event? 	e dependent? probabilities of disjoint an s? gram help us visualize th two or more events can of mine the frequency of eac s: Do Now, Homework,	nd e number ccur? ch outcome Evidence o On-spot Cho	 Mut Inde Con of Learning ecking for Ur	tually e epender npleme nderstar	xclusive events vs nt events vs. Deper ntary events nding, Teacher Fee	. Inclusive ndent event edback	events s
Summative/Benchmar Alternative Assessmen	k Assessment(s): Quizze ts: Portfolios, Online As	es, Chapter F signments	Reviews, Cha	apter Te	ests		
Resources/Materials: Key Vocabulary: https://njctl.org/courses/math/algebra-ii/ Probability, permutations, combinations, mutually exclusive, independent, complementary events, theoretic probability, experimental probability					lly theoretical		
Suggested Pacing Guide Lesson Name/Topic Student Learning Objective(s) Suggested Tasks/Activities: Day(s) t						Day(s) to	
Probabilities and Odds	-Analyze the differen and odds	-Analyze the difference between probabilities and odds Colorabete since he make bilities					2 days
Probabilities using Permutations	-Apply the permutation order matters) -Find the probabilitie	-Apply the permutation formula (used when order matters) -Find the probabilities of events involving permutations					3 days
Probabilities using Combinations	-Apply the combinati order does not matter -Find probabilities of triangles	-Apply the combination formula (used when order does not matter) -Find probabilities of events involving similar triangles					3 days
Disjoint and Overlapping Events	-Determine the difference between disjoint ("or") and overlapping ("and") <mutually exclusive vs. inclusive> -Calculate probabilities of disjoint and overlapping overlap</mutually 					3 days	
Independent and Dependent Events	-Determine the differ and dependent events -Calculate probabiliti dependent events	-Determine the difference between independent and dependent events Lesson, Applications, Revi Lesson, Applications, Revi -Calculate probabilities of independent and dependent events					3 days
Teacher Notes: 18 tota Additional Resources:	l days including assessme	ent days (qui	zzes, test)				
numonui Resources.	Differen	ntiation/Mo	dification St	rategie	25		
Students with Disabilities	English Language Learners	Gifted and Stuc	d Talented lents	Stu	idents at Risk	504 S	tudents
-Rephrase questions, directions, and explanations -Allow extended time on assessments -Consult with Case Managers and follow IEP	e questions, s, and ons temperating ons temperations intrinsic motivations intrinsic motivations				sult with ance Counselors ollow I&RS dures/action sult with coom teacher(s) pecific behavior rentions	-Rephrase directions explanatio -Allow ex on assess -Consult Guidance and 504 C to come u	e questions, , and ons tended time nents with Counselors Committees p with

modifications/accom		-Provide extended	procedures/504
modations		time to complete tasks	accommodations
		(on need basis)	

Unit #7 - Overview

Content Area: Algebra 2

Unit Title: Data Analysis and Statistics

Grade Level: 10/11

Core Ideas: Students will explore the world of statistics through the eyes of a researcher. The unit will cover a review of using combinations to find probability and then move onto various statistical data sets. With each data set, students will determine type of distribution and calculate the measures of central tendency and variation accordingly. Students will also design their own experimental and observational studies, collect data, and draw conclusions from their data, taking into account, any possible bias or margins of error.

Unit # 7 - Standards						
Standards (Content and Technology):						
CPI#:	Statement:					
Performance Expectations (NJSLS)						
NJSLS.A-APR.C.5 (+)	Know and apply the Binomial Theorem for the expansion of $(x+y)^n$ in powers of x and y					
	for a positive integer n, where x and y are any numbers, with coefficients determined, for					
	example, by Pascal's Triangle.					
NJSLS.S-MD.A.3 (+)	Develop a probability distribution for a random variable defined for a sample space in					
	which theoretical probabilities can be calculated; find the expected value.					
NJSLS.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 calculator, spreadsheets, and tables to estimate areas					
	under the normal curve.					
NJSLS.S-IC.A.1	Understand statistics as a process for making inferences about population parameters based					
	on a random sample from that population.					
NJSLS.S-IC.B.3	Recognize the purposes of and differences among sample surveys, experiments, and					
	observational studies; explain how randomization relates to each					
Mathematical Practices						
MP 1	Make sense of problems and persevere in solving them.					
MP 2	Reason abstractly and quantitatively.					
MP 3	Construct viable arguments and 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.					
Career Readiness, Life Litera	acies, and Key Skills					
9.2.12.CAP.5	Assess and modify a personal plan to support current interests and postsecondary plans.					
9.4.12.CI.1	Demonstrate the ability to reflect, analyze, and use creative skills and ideas					
9.4.12.CI.3	Investigate new challenges and opportunities for personal growth, advancement, and					
	transition					
9.4.12.TL.4	Collaborate in online learning communities or social networks or virtual worlds to					
	analyze and propose a resolution to a real-world problems					
Computer Science and Design	n Thinking					
8.1.12.CS.2	Model interactions between application software, system software, and hardware					
8.2.12.ITH.3	Analyze the impact that globalization, social media, and access to open source					
	technologies has had on innovation and on a society's economy, politics, and culture					
8.2.12.EC.2	Assess the positive and negative impacts of emerging technologies on developing					
	countries and evaluate how individuals, non-profit organizations, and governments have					
	responded					
Intercultural Statements (Am	uistad, Holocaust, LGBT, etc)					
LGBTQ and Disabilities	Explore mathematicians in the LGBTQ and disabled community, including but not					
NJSA 18A:35-4.35	limited to Juliette Bruce, NSF Postdoctoral Fellow at University of California, Berkeley					
	and Stephen Hawking, former Director of Research at the University of Cambridge.					

Amistad Law	Explore African-American ma	thematicians and scientists, including but not limited to				
NISA 18A:35-4 43	Martha Fundemia Lofton Havnes, the first African-American woman to earn a Ph D in					
	mathematics, and Elbert Fran	k Cox, the first African-American man to earn a Ph.D in				
	mathematics in the world					
	Discuss and analyze the movie <i>Hidden Figures</i> , the story of female African-American					
	mathematicians and engineers	who worked for NASA				
Holocaust Law	Explore Jewish mathematician	using the article " <i>lowish Mathematicians Who Changed</i>				
NISA 18A.25 28	Explore Jewish mainematicians using the article Jewish Mathematicians who Changed					
A ADLL ovy	Ine Course of History Irom jewishjournal.com					
AAPI Law	Explore Asian-American and Pacific Islander mathematicians and scientists, including					
NJSA 18A:25-4.44	but not limited to Dr. Peter Tsai, inventor of the N95 respirator and Diana Ma, data					
scientist and statistician for the Lakers						
Companion Standards						
RS1.9-10.7	Translate quantitative or technical information expressed in words in a text into visual					
	form (e.g., a table or chart) and translate information expressed visually or					
	mathematically (e.g., in an equ	uation) into words				
RST.11-12.7	Integrate and evaluate multiple	e sources of information presented in diverse formats and				
	media (e.g., quantitative data,	video, multimedia) in order to address a question or solve a				
	problem.					
RST.11-12.8	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text.					
	verifying the data when possible and corroborating or challenging conclusions with other					
	sources of information.					
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					
SL 11-12 /	Present information findings	and supporting evidence clearly concisely and logically				
SL.11-12.4	The content, organization, development, and style are appropriate to task pyrrase and					
	The content, organization, development, and style are appropriate to task, purpose and					
Intendicciplineary Composition	audience.					
Interdisciplinary Connection	E-store the second second second	and the standard st				
6.1.12.HistorySE.14.a	Explore the various ways women, racial and ethnic minorities, the LGBTQ community,					
	and individuals with disabilities have contributed to the American economy, politics and					
	society					
6.1.12.HistorySE.14.b	Use a variety of sources from a	diverse perspective to analyze the social, economic and				
	political contributions of marg	inalized and underrepresented groups and/or individuals.				
CASEL 5 SEL Framework						
Self-Awareness	-Demonstrate honesty and integrity					
	-Experience self-efficacy					
	-Develop interests and a sense of purpose					
Social Awareness	-Recognize strengths in others					
	-Understand and express gratit	ude				
Self-Management	-Identify and use stress management strategies					
C	-Exhibit self-discipline and self-motivation					
	-Use planning and organizational skills					
Relationshin Skills	-Communicate effectively					
Relationship Skins	-Communicate enectively					
	- reactive teaniwork and contaborative problem-sofving					
Pagnongihla Dagigion	Demonstrate ouriogity and on	an mindedness				
Molving	-Demonstrate curtosity and open-mindedness					
Waking	-Learn to make a reasoned judgment after analyzing information, data, facts					
	-Recognize now critical thinking	Ing skins are userul both inside & outside of school				
Unit Essential Question(s):	1	Unit Enduring Understandings:				
• In a normal distribution, what percent of data lies within		 Combinations and permutations 				
k standard deviations of the mean?		• Sample space of an event				
• How can we test theoretical probability?		Drobability				
	ai probability.	• Flobability				

^{What are some considerations when undertaking} a statistical study?
Recognize data sets that are normal
Analyze hypotheses and methods of collecting data

 How can we test a hypothesis about an experiment? How can we collect data to test a conjecture or draw a conclusion? How can we collect data that accurately represents a population? What is a binomial distribution? How is a binomial distribution related to Pascal's Triangle? Evidence of Learning Formative Assessments: Do Now, Homework, On-spot Checking for Understanding, Teacher Feedback 								
Alternative Assessmen	ts: Portfolios, Online Ass	signments						
Resources/Materials:			Key Vocabulary:					
https://njctl.org/courses/	math/algebra-11/		Normal dis	tribution, binomial distril	oution, star	ndard		
			deviation, r	neasures of central tende	ncy, measu	ires of		
			variation, sampling methods, bias, Pascal's Triangle,					
			Binomial T	heorem				
Lasson Nama/Tania	Student Learning O	Suggested P	acing Guide	Suggested Tecks/A	ativitios.	$\mathbf{D}\mathbf{o}\mathbf{v}(\mathbf{s})$ to		
Lesson Manie/ Popic	Student Learning O	ujecuve(s)		Suggesteu Tasks/A	cuvines.	Complete		
Binomial Theorem	-Use combinations to determine probabilities -Use Pascal's Triangle to find the number of combinations -Apply the Binomial Theorem to binomial			Lesson, Application	, Review	3 days		
Binomial Distributions	-Construct a probability distribution -Determine whether a probability distribution can be classified as a binomial distribution -Calculate probability of a specific number of success in a binomial distribution			Lesson, Application	Lesson, Application, Review 3 days			
Normal Distributions	-Use the Empirical Ru -Calculate area under -Calculate the z-score distribution and use it	-Use the Empirical Rule to determine normality -Calculate area under a normal curve -Calculate the z-score for a standard normal distribution and use it to find probabilities			Lesson, Application, Review 3 days			
Conclusions from Samples	-Classify samples (subsets) of population -Recognize bias in sampling -Calculate margin of error for a random sample of size n taken from a large population			Lesson, Application	Lesson, Application, Review 3 days			
Experimental and Observational Studies	-Identify and correct I -Identify experimenta -Explore comparative -Design experimental	y questioning ational studi causality tional studie	g Lesson, Application es	Lesson, Application, Review 3 days				
Teacher Notes: 18 tota	l days including assessme	ent days (qui	zzes, test)					
Additional Resources:								
Students with Disabilities	Differen English Language Learners	tiation/Mod Gifted and Stud	lification St I Talented ents	rategies Students at Risk	504 \$	Students		
-Rephrase questions, directions, and explanations	-Allow errors in speaking	-Provide ex activities	tension	-Consult with Guidance Counselors and follow I&RS	-Rephrase directions explanation	e questions, s, and ons		

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-Allow extended time	-Rephrase questions,	-Build on students'	procedures/action	-Allow extended time
on assessments	directions, and	intrinsic motivations	plans	on assessments
-Consult with Case	explanations		-Consult with	-Consult with
Managers and follow	-Allow extended time		classroom teacher(s)	Guidance Counselors
IEP	on assessments		for specific behavior	and 504 Committees
modifications/accom			interventions	to come up with
modations			-Provide extended	procedures/504
			time to complete tasks	accommodations
			(on need basis)	