Algebra 2 Level A Unit 12

Marking Period	Unit Title	Recommended Instructional Days
4	Rational Exponents and Radical Functions	10 - 15 days

Domain: Number and Quantity, Algebra, Functions

NJSLS Strand:

Key:

Major Cluster

Supporting Cluster

Additional Cluster

N-RN.A.1 Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents.

N-RN.A.2 Rewrite expressions involving radicals and rational exponents using the properties of exponents.

Progress Indicator:
Tests • Quizzes • Practice problems for homework • Online textbook • Worksheets • Leveled assessments

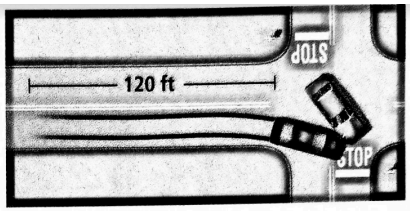
Recommended Activities, Investigations, Interdisciplinary Connections, and/or Student Experiences to Explore NJSLS-CLKS within Unit

Essential Question/s:
How are rational exponents and radical equations used to solve real-world problems?

Activity Description:
Nth root, radicals, and rational exponents
Properties of Exponents and Radicals
Solving Radical Equations

Interdisciplinary Connections:
Physics Content: Speed
NJSLS#: HS-PS2-1

The speed s in miles per hour that a car is traveling when it goes into a skid can be estimated by using the formula $s = \sqrt{30fd}$, where f is the coefficient of friction and d is the length of the skid marks in feet.

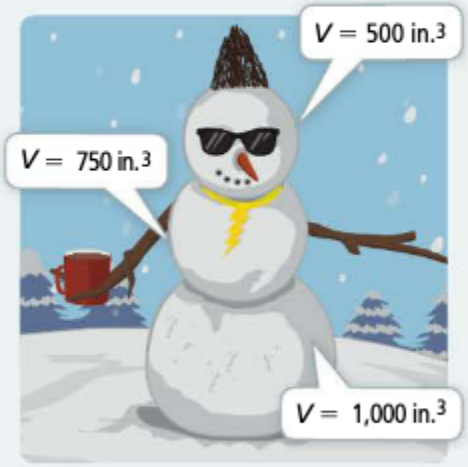


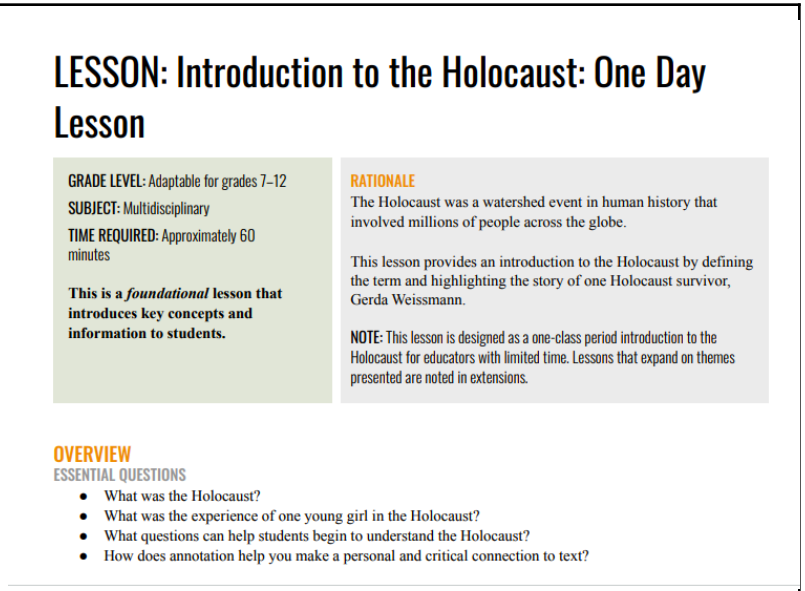
After an accident, a driver claims to have been traveling the speed limit of 45 mi/h. The coefficient of friction under accident conditions was 0.7. Is the driver telling the truth about his speed? Explain.

Answer:

A-SSE.A.2 Use the structure of an expression to identify ways to rewrite it. **A-REI.A.1** Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method. **A-REI.A.2** *S*olve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise. **F-IF.B.4** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given in a verbal description of the relationship. *Key features include: intercepts; intervals where the function is*		If the driver were traveling 45 mi/h, the skid marks would measure about 96 ft. Because the skid marks actually measure 120 ft, the driver must have been driving faster than 45 mi/h. **Example Tasks:** **Task 1:** Simplify $\sqrt[3]{54x^6y^{10}}$ **Answer:** $3x^2y^3\sqrt[3]{2y}$ **Task 2:** Solve $\sqrt{x+15}$ = x - 5. State any extraneous solutions. **Answer:** x = 10; extraneous solution: x = 1 **At the end of each topic please review the Assessment Practice and Performance Tasks questions.**

increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.* **F-IF.C.7** 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. **F-BF.A.1** Write a function that describes a relationship between two quantities. **F-BF.B.3** Identify the effect on the graph of replacing f(x) by f(x) + k, kf(x), f(kx), and f(x +k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology.		**ASSESSMENT PRACTICE** **53.** Aaron is rewriting $\frac{1+\sqrt{3}}{5-\sqrt{3}}$ into reduced radical form. Determine if Aaron would have written the steps below to show his work. Select *Yes* or *No*. | | Yes | No | | $\frac{6+4\sqrt{3}-3}{25+9}$ | ❑ | ❑ | | $\frac{5+\sqrt{3}+5\sqrt{3}+\sqrt{9}}{25+5\sqrt{3}-5\sqrt{3}-\sqrt{9}}$ | ❑ | ❑ | | $\frac{4+3\sqrt{3}}{11}$ | ❑ | ❑ | | $\frac{8+6\sqrt{3}}{28}$ | ❑ | ❑ | | $\frac{5+6\sqrt{3}+3}{25-3}$ | ❑ | ❑ |

Include recognizing even and odd functions from their graphs and algebraic expressions for them **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 a graph or table, given that the function has an inverse. d. (+) Produce an invertible function from a non-invertible function by restricting the domain.		**55. Performance Task** The volume of a sphere of radius r is $V = \frac{4}{3}\pi r^3$. **Part A** Use the formula to find r in terms of V. Rationalize the denominator. **Part B** A snowman is made using three spherical snowballs. The top snowball for the head has a volume of 500in. ^{3}. What is the diameter of the top snowball?  **Part C** The volumes of the other two snowballs are 750in. ^{3} and 1,000in. ^{3}. How tall is the snowman? **Spot Light on: Holocaust Law**



LESSON: Introduction to the Holocaust: One Day Lesson

GRADE LEVEL: Adaptable for grades 7–12

SUBJECT: Multidisciplinary

TIME REQUIRED: Approximately 60 minutes

This is a *foundational* lesson that introduces key concepts and information to students.

RATIONALE

The Holocaust was a watershed event in human history that involved millions of people across the globe.

This lesson provides an introduction to the Holocaust by defining the term and highlighting the story of one Holocaust survivor, Gerda Weissmann.

NOTE: This lesson is designed as a one-class period introduction to the Holocaust for educators with limited time. Lessons that expand on themes presented are noted in extensions.

OVERVIEW

ESSENTIAL QUESTIONS

- What was the Holocaust?
- What was the experience of one young girl in the Holocaust?
- What questions can help students begin to understand the Holocaust?
- How does annotation help you make a personal and critical connection to text?

Mathematics Practices
1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reason of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.

Social and Emotional Learning: ***Competencies***	**Social and Emotional Learning:** ***Sub-Competencies***

Self- awareness Social Awareness Self- Management Relationship Skills Responsible Decision-Making	Recognizing the importance of self-confidence in handling daily tasks and challenges. Demonstrate an awareness of the expectations for social interactions in a variety of ways. Demonstrate an understanding of the need for mutual respect when viewpoints differ. Recognize the skills needed to establish and achieve personal and educational goals. Utilize positive communication and social skills to interact effectively with others. Develop, implement, and model effective problem solving and critical thinking skills.	

Assessments (Formative) ***To show evidence of meeting the standard/s, students will successfully engage within:***	**Assessments (Summative)** ***To show evidence of meeting the standard/s, students will successfully complete:***
<u>Formative Assessments:</u> ● Entry and Exit Slips ● Quizzes ● Self Assessments	**<u>Benchmarks:</u>** ● Chapter Tests ● Projects ● LinkIT **<u>Summative Assessments:</u>** ● District Assessments ● Midterms ● Standardized Tests

Differentiated Student Access to Content:
Teaching and Learning *Resources/Materials*

Core Resources	**Alternate Core Resources**	**ELL Core Resources**	**Gifted & Talented Core Resources**

	IEP/504/At-Risk/ESL		
• Savvas Envision • Achieve the core • Khan Academy • Desmos	• Skill building worksheets • Math Manipulatives	• Dictionary for native languages • Videos in their native language.	• Leveled Assessments • Enrichment worksheets

Supplemental Resources

Technology:
- **Chromebooks, Graphing Calculators, Smartboards**

Other:
- **Zoom and Google Meets, Schoology, Interactive Textbooks**

Differentiated Student Access to Content:
Recommended *Strategies & Techniques*

Core Resources	**Alternate Core Resources *IEP/504/At-Risk/ESL***	**ELL Core Resources**	**Gifted & Talented Core**
• **Deliver instruction utilizing varied learning styles including audio, visual, and tactile/kinesthetic, provide individual instruction as needed, modify assessments and/or rubrics, repeat**	• **Utilize a multi-sensory (VAKT) approach during instruction, provide alternate presentations of skills by varying the method (repetition, simple explanations, additional examples, modeling, etc.), modify test content and/or format, allow students to retake test for additional credit, provide additional times and preferential seating as needed, review, restate and repeat directions, provide study guides, and/or break**	• **Extend time requirements, preferred seating, positive reinforcement, check often for understanding/review, oral/visual directions/prompts when necessary, supplemental materials including use of an online bilingual dictionary, and modified assessment and/or rubric.**	• **Create an enhanced set of introductory activities, integrate active teaching/learning opportunities, incorporate authentic components, propose interest-based extension activities, and connect student to related**

	assignments into segments of shorter tasks.		

NJSLS CAREER READINESS, LIFE LITERACIES & KEY SKILLS	**Disciplinary Concept: Creativity and Innovation**	
	Core Ideas:	**Collaborative digital tools can be used to access, record and share different viewpoints and to collect and tabulate the views of groups of people.**
	Performance Expectation/s:	**9.4.12.TL.3: Analyze the effectiveness of the process and quality of collaborative environments.** **• 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 problem (e.g., 7.1.AL.IPERS.6).**
	Career Readiness, Life Literacies, & Key Skills Practices	
	Act as a responsible and contributing community member and employee. **Attend to financial well-being.** **Consider the environmental, social and economic impacts of decisions.** **Demonstrate creativity and innovation.** **Utilize critical thinking to make sense of problems and persevere in solving them.** **Model integrity, ethical leadership and effective management.** **Plan education and career paths aligned to personal goals.** **Use technology to enhance productivity, increase collaboration and communicate effectively.** **Work productively in teams while using cultural/global competence.**	

New Jersey Legislative Statutes and Administrative Code (place an "X" before each law/statute if/when present within the curriculum map)									
	Amistad Law: *N.J.S.A. 18A 52:16A-88*	X	Holocaust Law: *N.J.S.A. 18A:35-28*		LGBT and Disabilities Law: *N.J.S.A. 18A:35-4.35*		Diversity & Inclusion: *N.J.S.A. 18A:35-4.36a*		Standards in Action: *Climate Change*