Unit 1: Understanding Rational Numbers

Content Area: **Math**
Course(s):
Time Period: **MP1**
Length: **45**
Status: **Published**

NJSLS

HS.N-RN.A.1 Explain how the definion of the meaning of raonal exponents follows from extending the properes of integer exponents to those values, allowing for a notaon for radicals in terms of raonal exponents. For example, we define 5 1/3 to be the cube root of 5 because we want (5 1/3) 3 = 5(1/3) 3 to hold, so (5 1/3) 3 must equal 5.

HS.N-Q.A.1 Use units as a way to understand problems and to guide the soluon of mul-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

HS.A-CED.A.2 Create equaons in two or more variables to represent relaonships between quanes; graph equaons on coordinate axes with labels and scales.

HS.G-MG.A.1 Use geometric shapes, their measures, and their properes to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder). □

HS.G-MG.A.2 Apply concepts of density based on area and volume in modeling situaons (e.g., persons per square mile, BTUs per cubic foot). □

HS.A-CED.A.3 Represent constraints by equaons or inequalies, and by systems of equaons and/or inequalies, and interpret soluons as viable or nonviable opons in a modeling context. For example, represent inequalies describing nutrional and cost constraints on combinaons of different foods.

Rationale, Transfer Goals, and Enduring Understandings

This unit and course is aligned with Camden County Community College and both of their non-credit math courses. The course is actually directed by the math department at Camden County and if students are able to pass the Camden County College final in those courses they will give them credit for the course regardless of what their Accuplacer score is. The accuplacer is a placement test that all students must take when they enter Camden County, it is a med test on a computer with no calculator. The two non-credit courses go back to the foundaon of mathemacs to strengthen students' understanding of why we do what we do with math. Integrated Math strengthens the students basic skills, the building blocks of mathemacs, and understanding of math so they can develop a comprehensive understanding of higher level mathemacs. In the inial unit for this course, the students will develop a more in depth understanding of real numbers and how decimals and fracons are really the same number with just a different look. They will be able to manipulate fracons and decimals to work out mulple situaons and problems. Students should gain a greater understanding of why we have an order to operaons when using mathemacs

Essential Questions

- ● How do you read, write and compare (represent) whole numbers, decimals and fractions?
- ● How do you multiply or divide multiple digit numbers?
- ● How can the strategy “draw a diagram” help you solve fraction division problems?
- ● Why do we use numbers, what are their properties, and how does our number system function?
- ● What makes a strategy effective and efficient and the solution reasonable?
- ● Why do we use numbers, what are their properties, and how does our number system function?

Content

-The decimal place-value system

-Adding, subtracting, multiplying and dividing whole numbers

-Rounding, estimation and order of whole numbers

-Exponential Notation and the order of operations

-Prime numbers and divisibility

-Factoring whole numbers

-Fraction basics

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Simplifying fractions

-Multiplying fractions

-Dividing fractions

-Adding and subtracting fractions with like denominators

-Adding and subtracting fractions with unlike denominators

-Adding and subtracting mixed numbers

-Order of operations with fractions

-Estimation applications

-Place value and rounding of decimals

-Conversion of decimals to fractions and fractions to decimals

-Adding and subtracting decimals

-Multiplying and dividing decimals

Skills

-Classify and graph real numbers on a number line.

-Use exponential notation

-Evaluate expressions containing powers of whole numbers

-Evaluate expressions that contain several operations

-Find the factors of a number

-Determine whether a number is prime, composite, or neither

-Find the prime factorization of any number

-Find the Greatest Common Factor (GCF) of two numbers

-Find the GCF for a group of numbers

Identify the numerator and denominator of a fraction

-Identify proper and improper fractions

-Write improper fractions as mixed numbers and mixed numbers as improper fractions

-Use the fundamental principle to simplify fractions

-Determine if two fractions are equivalent

-Find the reciprocal of a fraction

-Multiply and divide two fractions

-Multiply and divide mixed numbers and fractions

-Estimate products by rounding

-Solve applications involving multiplication and division of fractions

-Add and subtract two like fractions

-Add and subtract a group of like fractions

-Find the Least Common Multiple (LCM) of a group of numbers

-Add or subtract two fractions

-Add or subtract any group of fractions

-Add or subtract and two mixed numbers

-Add or subtract any group of mixed numbers

-Solve and application that involves addition or subtraction of mixed numbers

-Evaluate and expression with grouping symbols

-Solve an application that involves evaluating an expression

-Use estimation to solve application problems

-Identify place value in a decimal form

-Write a decimal in words

-Write a decimal as a fraction or mixed number

-Round decimals to a specified decimal place

-Convert a decimal to a fraction and a fraction to a decimal

-Convert a common fraction to a repeating decimal and a repeating decimal to a common fraction

-Add or subtract two or more decimals

-Use addition or subtraction to solve application problems

-Multiply or divide two or more decimals

-Use multiplication or division to solve application problems

-Multiply or divide by powers of 10

-Use multiplication or division by power of 10 to solve application problems

Activities/Strategies

Math practice individually, whole group, and small group.

Peer group leadership

Student presentations of concepts and demonstration of skills

Students given access to online practice IXL

Partners or group work (groups formed heterogeneously according to ability)

Students given access to Khan Academy

Students given access to Google Classroom

Students given access to Screencastify

Students given access to EdPuzzle Pro

Evidence (Assessments)

Formative

Teacher observation and questioning

Seat and or group work

Fist to five/ Thumbs up, thumbs down

Homework

Student participation at board

Summative

Edpuzzle pro quizzes

Notebook Quiz

Homework Checks

Regular Quizzes and tests

Unit 1 Benchmark Assessment

Spiraling for Mastery

Content or Skill for this Unit	Spiral Focus from Previous Unit	Instructional Activity
Adding, Subtracting, Multiplying and Dividing Real Numbers Adding, Subtracting, Multiplying and Dividing Fractions Adding, Subtracting, Multiplying and Dividing mixed numbers Adding, Subtracting, Multiplying and DIviding decimals	• 8.EE.A.1,2 & 3 Expressions and Equations A. Work with radicals and integer exponents. 1. Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, 32 × 3–5 = 3–3 = 1/33 = 1/27. 2. Use square root and cube root symbols to represent solutions to equations of the form x2 = p and x3 = p, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that √2 is irrational. 3. Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. For example, estimate the population of the United States as 3 × 108 and the population of the world as 7 × 109 , and determine that the world population is more than 20 times larger. 6.EE.A.1 & 3 Expressions and Equations A. Apply and extend previous	Students given handouts of powerpoint notes Students provided with google slide presentations Students given access to online help from multiple locations Partners or group work (groups formed heterogeneously according to ability) IXL https://www.ixl.com/inspiration/get-started Open Source activities below from Illustrative Math

	understandings of arithmetic to algebraic expressions. 1. Write and evaluate numerical expressions involving whole-number exponents. 3. Apply the properties of operations to generate equivalent expressions. For example, apply the distributive property to the expression 3 (2 + x) to produce the equivalent expression 6 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6 (4x + 3y); apply properties of operations to y + y + y to produce the equivalent expression 3y	Tenths and Hundredths FInd the Change **Dividing by a Fraction is the Same as Multiplying by its Reciprocal** Batting Average Buying Gas Movie Tickets Setting Goals What is the best way to divide Pennies to Heaven Video Game Credits

Career Awareness, Exploration, Preparation, and Training

9.4.12.CT.1	Identify problem-solving strategies used in the development of an innovative product or practice (e.g., 1.1.12acc.C1b, 2.2.12.PF.3).
9.4.12.CT.2	Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a).
9.4.12.IML.1	Compare search browsers and recognize features that allow for filtering of information.

9.4.12.TL.1	Assess digital tools based on features such as accessibility options, capacities, and utility for accomplishing a specified task (e.g., W.11-12.6.).

21st Century Skills

CRP2. Apply appropriate academic and technical skills.

CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.

CRP11. Use technology to enhance productivity.

Interdisciplinary Connections

NJSLS ELA

NJSLSA.R7. Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.

NJSLA Science

HS-PS4-1. Use mathematical representations to support a claim regarding relationships among the frequency, wavelength,

and speed of waves traveling in various media.

HS-PS3-1. Create a computational model to calculate the change in the energy of one component in a system when the

change in energy of the other component(s) and energy flows in and out of the system are known.