UNITS DESIGN FRAMEWORK
PART I: UNIT OVERVIEW

Content	Technical Mathematics
Grade Level	9-12th grade
Power Standard/CCSS Power Standard	Fractions, decimals, and percent.
Suggested Length of Unit	4 meetings of 20-60 minutes depending on student engagement and mastery.

Reference Deconstruction Document and Power Standard/CCSS Power Standard	N-RN3: Adding thirds to thirds result in thirds, etc., and multiplying fractions to fractions will result in a simple fraction. N-Q1: Use units to guide the solution to a problem. N-Q2: Use inches, sixteenths, or thousandths of an inch appropriately. A-SSE1b: Identify parts of an expression A-SSE3: Choose a form of an expression to write as needed in context. Look for mph, ft-lbs, in-lbs, or other desired units based on the problem. A-CED1: Create equations in one variable and use them to solve problems. A-REI3: Solve equations in one variable. MODELING: included with other standards. MP1: MP3: MP4: MP8:

Unwrapped Concept: Pull "the what" from deconstruction documents, should represent what students need to know.	Key Vocabulary: Pull academic vocabulary from deconstruction documents, should represent what students need to be able to do.	Depth of Knowledge (DOK)
Fraction arithmetic, using fractions to find rise/ft, m/h, or other content-relevant expression	Fraction, numerator, denominator, common, equivalent, "per", "of."	Solve, use, represent DOK 2

Supporting Standards (current and CCSS): Standards that build to the power standard.	Other Vocabulary Terms: Terms worth covering in the unit.
MP1, MP3, MP4, MP8	TRY, invert, set, closed set, closed under addition…

Reference to Power Standard Assessment: Paste the link to the appropriate power standard assessment in this box.	Fractions, Decimals and Percents

Directions:

1. Copy the unwrapped power standard concepts, vocabulary, and DOK into the frames provided below.
2. Brainstorm three to five possible performance tasks that incorporate these concepts, skills, and levels of rigor.
3. Write a synopsis for each selected task and list the tasks in a "learning progressions" sequence. Bold those concepts and skills that are directly represented in the tasks.

Concepts:	Vocabulary:	DOK:
N-RN3: Adding thirds to thirds result in thirds, etc., and multiplying fractions to fractions will result in a simple fraction. N-Q1: Use units to guide the solution to a problem. N-Q2: Use inches, sixteenths, or thousandths of an inch appropriately. A-SSE1b: Identify parts of an expression A-SSE3: Choose a form of an expression to write as needed in context. Look for mph, ft-lbs, in-lbs, or other desired units based on the problem. A-CED1: Create equations in one variable and use them to solve problems. A-REI3: Solve equations in one variable.	Fraction, numerator, denominator, common, equivalent, "per", "of", TRY, invert, set, closed set, closed under addition.	2

Learning Progressions:

Task 1: Students begin with formal instruction on combining fractions. Progress from adding screws to screws or filters to filters and allow the students to point out the difference between sheet metal screws and drywall screws (or other content-specific materials), then note the importance of being specific. E.g. when counting the number of filters a shop needs for next weeks' oil changes it is important not to add fuel filters to oil filters, etc.

It should be easy, then, to compare the example given to the idea of measurement. It makes no sense to add 1/8 inch to 1/16 inch. Use mental math to make sense of the 1/16 inch tape measure. Finally, extend that to "math class" fraction addition with any set of numbers. Stress the importance of reducing the final answer so that all parties are on the same page.

Task 2: Begin with a rate-style fraction. M/h, oil/gas, fall/ft, or activator/filler are good examples of using a fraction to think about problems. Use the units and the idea of 'canceling' to help facilitate the use of unit analysis to solve problems. Given different scenarios the student should be able to find miles given m/g and g, etc. Students should be able to point out the different parts of an expression, for example 30/1.5 mph means the vehicle went 30 miles in 1.5 hrs, etc.

Task 3: Students are given a Compass-style post-test.

Task 4: Students who need extra help, based on post-test results, will get targeted intervention.

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Concepts:	Vocabulary:	DOK:

Learning Progressions:

Task 1:

Task 2:

Task 3:

Task 4: