PRACTICING WITH THE SHIFTS: THE COMMON CORE STATE STANDARDS FOR MATHEMATICS (ANSWER DOCUMENT)

Shift One: Focus strongly where the Standards focus. In your groups, discuss ways to respond to the following question, "Why focus? There's so much math that students could be learning. Why limit them to just a few things?"

Engaging with the shift: What do you think belongs in the major work of each grade?

Grade	Which 2 of the following represent areas of major focus for the indicated grade?		
K	Compare numbers	~~Use tally marks~~ Tally marks are not a topic in the Standards	Understand meaning of addition and subtraction
1	Add and subtract within 20	Measure lengths indirectly and by iterating length units	~~Create and extend patterns and sequences~~ "Patterns are a tool, not a topic." Pattern work is included in the standards with very specific aims, but simple creation and extension of patterns is not something that is required. Purposeful work with patterns begins in later grades.
2	Work with equal groups of objects to gain foundations for multiplication	Understand place value	~~Identify line of symmetry in two dimensional figures~~ Students will not be working with symmetry until 4th grade, where it is an additional cluster, not major work.
3	Multiply and divide within 100	~~Identify the measures of central tendency and distribution~~ Students will work with central tendency in middle school, when they have developed solid computational skills and can use authentic data.	Develop understanding of fractions as numbers
4	~~Examine transformations on the coordinate plane~~ Transformations are part of the major work of 8th grade.	Generalize place value understanding for multi-digit whole numbers	Extend understanding of fraction equivalence and ordering

5	~~Understand and calculate probability of single events~~ Finding probability of an event occurs in 7th grade where it supports the major work of proportional reasoning.	Understand the place value system	Apply and extend previous understandings of multiplication and division to multiply and divide fractions
6	Understand ratio concepts and use ratio reasoning to solve problems	~~Identify and utilize rules of divisibility~~ Students are not required by the Standards to know the divisibility rules.	Apply and extend previous understandings of arithmetic to algebraic expressions
7	Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers	Use properties of operations to generate equivalent expressions	~~Generate the prime factorization of numbers to solve problems~~ Students are not required by the Standards to generate the prime factorization of a number.
8	~~Standard form of a linear equation~~ Though linear equations are a major focus of 8th grade, students are not required to use a "standard form."	Define, evaluate, and compare functions	Understand and apply the Pythagorean Theorem
Alg.1	~~Quadratic inequalities~~ Quadratic inequalities will be addressed in Alg. 2	Linear and quadratic functions	Creating equations to model situations
Alg.2	Exponential and logarithmic functions	~~Polar coordinates~~ Polar coordinates are not required by the Standards for Alg. 2	Using functions to model situations

Shift Two: Coherence: Think across grades, link to major topics within grades

In your groups, discuss what coherence in the math curriculum means to you. Be sure to address both elements—coherence within the grade and coherence across grades. Cite specific examples.

Engaging with the shift: Investigate coherence in the standards with respect to fractions.

In the space below, copy all of the standards related to multiplication and division of fractions and note how coherence is evident in these standards. Note also standards that are outside of the Number and Operations—Fractions domain but are related to, or in support of, fractions. (Answers may vary)

Grade	Standard	Summary of the Standard (If the standard has sub-parts, summarize each sub-part.)
3	various	Standards that relate to the foundations of being able to multiply and divide fractions found in 3.OA and 3.NF
4	4.NF.1	Recognize & generate equivalent fractions
4	4.NF.4 a, b & c	Apply and extend previous understandings of multiplication to multiply a fraction by a whole number
4	4.MD.2	Use 4 operations to solve word problems…. involving simple fractions
5	5.NF.3	Interpreting a fraction as division of the numerator by the denominator.
5	5.NF.4	Apply & extend previous understandings of multiplication to multiply a fraction or whole number by a fraction
5	5.NF.5	Interpret multiplication as scaling (resizing)
5	5.NF.6	Solve real word problems involving multiplication of fractions and mixed numbers
5	5.NF.7	Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions
5	5.MD.2	Use operations on fractions to solve problems involving information presented in line plots
6	6.NS.1	Apply & extend previous understandings of multiplication and division to divide fractions by fractions
6	6.G.2	Find volume of a right rectangular prism with fractional edge lengths….
7	various	Standards that relate to ratio and proportion (7.RP) and standards extending fractions to rational numbers 7.NS.1-3

Shift Three: Rigor: In major topics, pursue conceptual understanding, procedural skill and fluency and application with equal intensity

In your groups, discuss ways to respond to one of the following comments: "These standards are expecting that we just teach rote memorization. Seems like a step backwards to me." Or "I'm not going to spend time on fluency—it should just be a natural outcome of conceptual understanding."

Engaging with the shift: Making a true statement: Rigor = _conceptual understanding__ + __procedural skill and fluency__+ ____application__

This shift requires a balance of three discrete components in math instruction. This is not a pedagogical option, but is required by the standards. Using grade 3 or 6 as a sample, find and copy in the space below standards which specifically set expectations for each component.

Some standards such as 3.OA.4, 3.MD.6 , 3.G.2 and 6.EE.1, 6.EE.2 could be argued to require procedural skill and/or conceptual understanding. Not every Standard will necessarily fit neatly into one of these 3, however as seen by this exercise the majority of Standards specifically call for either fluency, conceptual understanding, or application.

Grade 3 or 6 standards that require **fluency**:

Grade 3: 3.OA.7; 3.NBT.2

Grade 6: 6.NS.2, 6.NS.3

Grade 3 or 6 standards that require **deep conceptual understanding**:

Grade 3: 3.OA.1-2, 5-6, 9; 3.NBT.1, 3.NF.1-3, 3.MD.5, 7; 3.G.1

Grade 6: 6.RP.1-2; 6.NS.1, 4-7; 6.EE.3-5; 6.G.1,2; 6.SP.1-3

Grade 3 or 6 standards that require **application**:

Grade 3: 3.OA.3,8; 3.MD.1-4,8

Grade 6: 6.RP.3; 6.NS.1, 8; 6.EE.6-9; 6.G.1-4; 6.SP.4-5