Unpacked South Dakota State Mathematics Standards

Purpose: *In order for students to have the best chance of success, standards, assessment, curriculum resources, and instruction must be aligned in focus, coherence, and rigor. Unpacked standards documents are intended to help align instruction to the focus, coherence, and rigor of the South Dakota State Mathematics Standards. The standards have been organized in clusters as they are not so much built from topics, but rather woven out of progressions. Not all content in a given grade is emphasized equally in the mathematics standards. Some clusters require greater emphasis than others based on the depth of the ideas, the time that they take to master, and/or their importance to future mathematics or the demands of college and career readiness. To say that some things have greater emphasis is not to say that anything in the standards can safely be neglected in instruction. Neglecting standards will leave gaps in student skill and understanding and may leave students unprepared for the challenges of a later grade.*

Domain: Numbers and Operations in Fractions	**Grade Level: 5**

5.NF.A Cluster: Use equivalent fractions as a strategy to add and subtract fractions.

Students will apply their understanding of fractions and fraction models to represent the addition and subtraction of fractions with unlike denominators as equivalent calculations with like denominators. Students will estimate and decide if an answer is reasonable.

****This is a MAJOR cluster.** *Students should spend the large majority of their time (65-85%) on the major work of the grade. Supporting work and, where appropriate, additional work should be connected to and engage students in the major work of the grade.*

5.NF.1 Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference with a like denominator. It is not necessary at this grade level to simplify the sum or difference. For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd.)

5.NF.2 Solve word problems involving addition and subtraction of fractions.[1]

- **a.** Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem.
- **b.** Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. For example, recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 < 1/2.

Aspects of Rigor for Student Learning: (Conceptual, Procedural, and/or Application)

Conceptual Understanding	***Procedural Fluency***	***Application***
Understand that fractions with unlike denominators can be replaced with equivalent fractions with like denominators when adding or subtracting. **(5.NF.1)**	Add and subtract fractions with unlike denominators. **(5.NF.1)**	
Assess the reasonableness of answers, using mental estimation. **(5.NF.2.b)**	Add and subtract fractions, including those with unlike denominators. **(5.NF.2a)**	Solve word problems using addition and subtraction of fractions, including those with unlike denominators. **(5.NF.2,b)**

Enacting the Mathematical Practices - Evidence of Students Engaging in the Practices

1. **Make sense of problems and persevere in solving them.**
   - Students make sense of problems when developing their conceptual understanding of addition and subtraction of fractions using both mixed numbers and unlike denominators**.**
2. **Reason abstractly and quantitatively.**
   - Students use quantitative reasoning to assess the reasonableness of answers.
3. **Construct viable arguments and critique the reasoning of others.**

4. **Model with mathematics.**
    - Students use fraction models to build understanding of addition and subtraction of fractions with both mixed numbers and unlike denominators.
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.**

Vertical and Horizontal Coherence and Learning Progressions

Previous Learning Connections	***Current Learning Connections***	***Future Learning Connections***
In 4th grade, students compare fractions with different denominators by creating common denominators. (**4.NF.1,2)** Students add and subtract fractions with like denominators. **(4.NF.3)** In 4th grade, students make a line plot to display a data set of measurements in fractions of a unit. **(4.MD.4)**	Students will make a line plot to display a data set and will add and subtract fractions of a unit to solve problems involving the information presented in the line plot. **(5.MD.2)**	In the future, students have to solve algebraic equations and real world problems using rational numbers. **(6.EE.7**)

Vocabulary *(Key Terms Used by Teachers and Students in this Cluster):*

- equivalent fractions

Relevance, Explanations, and Examples:

Students may use visual fraction models to help build their conceptual understanding of adding and subtracting fractions with unlike denominators. Because a common error when adding and subtracting fractions with unlike denominators is to add/subtract the numerators and denominators, using benchmark fractions will help students understand if their answer is reasonable.

Achievement Level Descriptors

Cluster: **Use equivalent fractions as a strategy to add and subtract fractions.**

Concepts and Procedures	***Level 1:*** Students should be able to add two fractions and mixed numbers with unlike denominators and subtract two fractions with unlike denominators when one denominator is a factor of the other in mathematical problems (denominators < 12). They should be able to use benchmark fractions (1/4s and 1/2s) and number sense with fractions to estimate mentally and assess the reasonableness of answers.
	Level 2: Students should be able to add fractions and mixed numbers with unlike denominators (denominators ≤ 12) in mathematical problems, subtract a mixed number from a whole number (denominators up to 4), and use benchmark fractions to estimate mentally and assess the reasonableness of answers (denominators ≤ 12).
	Level 3: Students should be able to add and subtract fractions and mixed numbers with unlike denominators in word problems and use number sense of fractions to estimate mentally and assess the reasonableness of answers.
	Level 4: