Cluster 5: Extend Understanding of Fractions

Duration: 2-3 weeks

Content Standards
This list includes standards that will be addressed in this cluster, but not necessarily mastered, since all standards are benchmarks for the end of the year. Please note strikethroughs and recommendations in the Important Considerations section for more information.

Extend understanding of fractions.
NC.4.NF.1
Explain why a fraction is equivalent to another fraction by using area and length fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size.

NC.4.NF.2
Compare two fractions with different numerators and different denominators, using the denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions by:
- Reasoning about their size and using area and length models.
- Using benchmark fractions 0, ½, and a whole.
- Comparing common numerator or common denominators.

Mathematical Practices
1. Make sense of problems and persevere in solving them
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning 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.

What is the mathematics?
This cluster extends fraction equivalence and ordering that was first introduced in Grade 3. In Grade 4, students will use visual models and explain why a fraction is equivalent with attention to how the number and size of parts differ even though the amounts themselves are the same. Students compare and order fractions through reasoning about the size of fractions using benchmark fractions, models, and/or the use of equivalent fractions. Students use greater than, less than, and equal to symbols to record comparisons and are able to justify their conclusions. Student continue the work of equivalent fractions and explore decimal fractions through the use of models. Students use their experience with fractions and place value to make connections between fractions and decimals.

- Students will expand their understanding of fractions (ex: numerator and denominator relationship to the whole) and verify their thinking with visual models (ex: area model, number line, tape diagram.
- Students will explain that fractions are relative to the size of the whole and apply that understanding when comparing fractions.
- Investigate equivalence through real world contexts.

- Represent equivalent fractions using models (area model, number line, tape diagram) and verify that while the number and the size of the parts differ, the fractional amount is the same.
- Use models/pictures/number lines to explain why different fractions are (or are not) equivalent.
- Recognize and generate equivalent fractions.
- Use benchmark fractions to reason about fractions including comparing and ordering fractions
- Develop multiple strategies (area models, number lines, benchmark fractions, and/or understanding of equivalence, using common numerators or common denominators) to compare and order fractions.
- Use understanding of equivalent fractions to explore decimal fractions (tenths and hundredths using area model, number line, decimal grids).

Important Considerations:
- Prior to beginning work with equivalent fractions, ensure that students have experience with multiple models to represent fractions and understand the connection between the symbolism of the fraction and the meaning of the numerator and denominator.
- As students develop an understanding of equivalent fractions through use of visual models, they begin to see the relationship between multiplication and fraction equivalence.
- Students need the chance to create their own drawings when working on tasks rather than always being presented with pre-made fraction materials that are already shared fairly for them.
- In fifth grade, students learn equivalence as "multiplying by 1." Note that this is not the focus in fourth grade as the goal is for students to reason and justify their thinking using models.
- Using a context(s) when engaging in comparison can help students understand why it is only valid to compare two fractions when they refer to the same whole.