Gateway Regional School District

Atlas

Unit Plan

Fraction Equivalence & Comparison

Chester / Littleville Elementary / Grade 4 / Mathematics

Week 5 - Week 8 | 5 Curriculum Developers | Last Updated: Mar 19, 2024 by LeBlanc, Deanna

Style Guide

What is the purpose of the unit? What are the major take-aways?

Standards

MA: Mathematics (2017)

MA: Grade 4

Number & Operations in Base Ten

4.NBT Use place value understanding and properties of operations to perform multi-digit arithmetic of whole numbers less than or equal to 1,000,000.

- [x] 4. Fluently add and subtract multi-digit whole numbers using the standard algorithm.
- [x] 5. Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

Number & Operations—Fractions

4.NF Extend understanding of fraction equivalence and ordering to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.
Show Details

- [x] 1. Explain why a fraction a/b is equivalent to a fraction (n × a)/(n × b) by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions, including fractions greater than 1.
- [x] 2. Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. 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, e.g., by using a visual fraction model.

Enduring Understandings

Enduring Understandings for the unit "Fraction Equivalence & Comparison":

1. Equivalence Concepts: Students will understand that fractions may look different but can represent the same quantity. They will recognize that equivalent fractions are different expressions of the same number and that the process of finding equivalent fractions involves multiplying the numerator and denominator by the same number. This understanding is the foundation for simplifying fractions and performing operations with them.

2. The Role of Multiplication: Students will understand that multiplying the numerator and denominator of a fraction by the same non-zero whole number results in a fraction that represents

Essential Questions

Certainly! As a Grade 4 Mathematics teacher addressing the unit "Fraction Equivalence & Comparison," your Essential Questions might include:

1. **Understanding Equivalence**
- How can we show that two fractions are equivalent even if they look different?
- What does it mean for fractions to be equivalent, and why is understanding equivalent fractions important in everyday life?
- What role does multiplication play in creating equivalent fractions?

2. **Visualizing Fractions**
- How can visual fraction models help us understand and compare

the same value. This concept helps students to comprehend the scalability of fractions and the idea that multiplication can create equivalent fractions.

3. Visual Representation: Students will understand the importance of visual models in demonstrating fraction equivalence. They will be able to illustrate the concept that fractions with different numerators and denominators can be equivalent by using models such as area representations, number lines, or sets. Visual models will also help them understand why multiplying by the same factor above and below creates fractions of equal size.

4. Reasoning with Fractions: Students will understand how to compare fractions by creating common denominators or numerators, or by using a benchmark fraction such as 1/2. They will learn that comparing fractions requires a common reference point and that fractions can only be compared directly when they refer to the same whole. They will be able to explain and justify their reasoning when determining which of two fractions is greater, less than, or equal to the other using mathematical symbols.

5. Mathematical Communication: Students will understand how to record and communicate the results of their fraction comparisons accurately, using symbols such as >, =, or <. They will justify their answers through mathematical reasoning, either by referring to visual fraction models, the concept of equivalence, or by creating fractions with a common denominator or numerator. This communication of mathematical reasoning will solidify their understanding and enable them to engage in discussions about fraction relationships.

By attaining these understandings, students will have a solid foundation for future work with fractions, including addition, subtraction, multiplication, and division. They will gain an appreciation for the role of fractions in representing numbers and quantities, and they will develop their skills in mathematical reasoning and communication.

fractions?
- In what ways can different visual models (like number lines or area models) help us with fractions?

3. **Generating Equivalent Fractions**
- How can you generate a new fraction that is equivalent to a given fraction?
- What patterns do you notice when generating a set of equivalent fractions for a given fraction?

4. **Comparison Strategies**
- What strategies can we use to compare fractions with different numerators and denominators?
- How can we use benchmarks, like 1/2, to help us compare two fractions that are not obviously bigger or smaller than each other?

5. **Justifying Comparisons**
- How can we justify our answers when comparing two fractions?
- What mathematical symbols and language can we use to show and explain the results of our fraction comparisons?

6. **Fractional Relationships**
- When comparing fractions, why is it important to ensure they refer to the same whole?
- How does changing the whole affect the size of a fraction?

7. **Application in Arithmetic**
- How do the skills of adding, subtracting, and multiplying whole numbers connect to understanding and working with fractions?
- What can the multiplication of whole numbers teach us about the relationship between parts and wholes in fractions?

These Essential Questions aim to guide students as they explore fraction equivalence and comparison, integrating the practice of arithmetic skills while also touching upon the conceptual understanding necessary to grasp the nature of fractions. They are designed to provoke critical thinking and help students make connections within the content area, as well as apply their learning to real-world contexts.

Content

In this unit, students extend their prior understanding of equivalent fractions and comparison of fractions.
In grade 3, students partitioned shapes into parts with equal area and expressed the area of each part as a unit fraction. They learned that any unit fraction 1/b results from a whole partitioned into b equal parts. They used unit fractions to build non-unit fractions, including fractions greater than 1, and represent them on fraction strips and tape diagrams. The denominators of these fractions were limited to 2, 3, 4, 6, and 8. Students also worked with fractions on a number line, establishing the idea of fractions as numbers and equivalent fractions as the same point on the number line.
Here, students follow a similar progression of representations. They use fraction strips, tape diagrams, and number lines to make sense of the size of fractions, generate equivalent fractions, and compare and order fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100. Students generalize that a fraction a/b is equivalent to fraction (n×a)/(n×b) because each unit fraction is being broken into n times as many equal parts, making the size of the part n times as small

Skills

Section A Goals
- Make sense of fractions with denominators 2, 3, 4, 5, 6, 8, 10, and 12 through physical representations and diagrams.
- Reason about the location of fractions on the number line.

Section B Goals
- Generate equivalent fractions with the following denominators: 2, 3, 4, 5, 6, 8, 10, 12, and 100.
- Use visual representations to reason about fraction equivalence, including using benchmarks such as 1212 and 1.

Section C Goals
- Use visual representations or a numerical process to reason about fraction comparison.

1/(n×b) and the number of parts in the whole n times as many (n×a). For example, we can see 3/5 is equivalent to 6/10 because when each fifth is partitioned into 2 parts, there are 2×3 or 6 shaded parts, twice as many as before, and the size of each part is half as small, 1(2×5) or 1/10.

As the unit progresses, students use equivalent fractions and benchmarks such as 1/2 and 1 to reason about the relative location of fractions on a number line, and to compare and order fractions.
Throughout the unit
Students continue to develop strategies for multiplying numbers mentally—building on their fluency from grade 3 and applying the properties of multiplication. The Number Talks in this unit support this goal, focusing on factors 2, 4, 5, 6, 8, 10, and 12. Students engage in strategies such as doubling and halving, relating these the folding of fraction strips and partitioning of tape diagrams into smaller unit fractions.
Here is a sampling of the Number Talk warm-ups in the unit.

lesson 5	lesson 9	lesson 16
2×122×12	10×610×6	5×65×6
4×124×12	10×1210×12	5×125×12
8×128×12	10×2410×24	6×126×12
16×1216×12	5×245×24	11×1211×12

These factors are intentionally chosen to build flexibility with the unit fractions in this unit. As students see the relationship between these factors and their products in Number Talks, they can become more efficient in determining equivalency and comparing fractions with these denominators.

How will you gauge student learning?

Assessments

How will students learn?

Learning Activities

Differentiated Instruction

Technology Integration

21st Century Skills

Positive Behavior

CASEL

Collaborative for Academic, Social, and Emotional Learning

Resources

Teacher Notes and Reflections

One optional lesson