Mathematics: Grade 4

Overview

In the grade two *Number Sense* domain, students read and write whole numbers within 1,000 and use place value understanding to compare two and three-digit numbers[2.NS.2,5]. In grade three, the number range for reading and writing whole numbers extends to 10,000,[3.NS.1] and by grade four students read, write, and compare whole numbers within 1,000,000.[4.NS.1] Grade three students round two and three-digit whole numbers to the nearest 10 or 100,[3.NS.6] and grade four students round multi-digit whole numbers to any given place value.[4.NS.7] In grade five, students generalize place value relationships and consider patterns generated when multiplying by powers of 10.[5.NS.3] Grade four students also use place value understanding to write tenths and hundredths in fraction and decimal notation[4.NS.5] and compare decimals to hundredths,[4.NS.6] which supports the decimal computation expected in grades five and six.

In grade three, students begin to build an understanding of the meaning of fractions through part and whole reasoning, visual models, and number lines.[3.NS.2-3] They also begin to consider fraction equivalence and compare simple fractions.[3.NS.4-5] Grade four students continue to deepen these ideas as they relate whole numbers, fractions, and mixed numbers[4.NS.2] and represent fraction equivalence using visual models.[4.NS.3] These understandings form an essential foundation that allows students to build proficiency with fraction operations in grades four through six and supports proportional reasoning and representation through grades six through eight.

Number Sense	
Learning Outcome	Students represent and round multi-digit numbers. Students model, compare, and generate equivalent fractions, mixed numbers, and decimal numbers to the tenths and hundredths.
Standard	**4.NS.4:** Compare two fractions with different numerators and different denominators (e.g., by creating common denominators or numerators, or by comparing to a benchmark, such as 0, 1/2, and 1). Explain why 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). (E)

Evidence Statements	Academic Vocabulary
• Use fraction models to represent and compare two fractions, explaining that the wholes must be identical. • Use fraction models to represent and compare two fractions with different numerators (e.g., 5/8 and 2/8), demonstrating that the whole	• Numerator • Denominator • Fraction • Compare • Greater than • Less than

may be divided into the same number of equal parts (8), yet the fraction with the smaller numerator will be less (2/8 < 5/8). ● Use fraction models to represent and compare two fractions with different denominators (e.g., 1/2 and 3/8), demonstrating how to find common denominators to aid in the comparison. ● Plot two fractions with different numerators and denominators on a number line to make a comparison. ● Use benchmarks such as 0, 1/2, and 1 to reason about comparing two fractions. ● Use the symbols >, =, or < to record the results of comparisons and correctly read the comparisons using the correct fraction and symbol name (e.g., one-half is greater than one-fourth).	● Equal to ● Whole ● Benchmark fraction
Clarification Statements	**Common Misconceptions**
● Students should use visual fraction models, number lines, and benchmark fractions to reason about and compare fractions in grade four. The use of algorithms should be limited. ● When using benchmark fractions to make comparisons, it is important that students explain the relationship between the numerator and denominator in their explanation. For example, a student may know that 1⁄4 is less than 1⁄2 because when one whole is cut into four pieces, the pieces are much smaller than if the whole is cut into only two pieces. ● Teachers should model using unit fractions to reason about and compare fractions, such as 3/5 and 3/8. If a whole were cut into five equal pieces, those pieces would be larger than if the whole were cut into eight pieces. Therefore, 1/5 is greater than 1/8. Using this relationship, students can conclude 3/5 is greater than 3/8. ● Teachers should model how to read comparison statements, saying the fractions and comparison signs correctly. ● Students should not use cross multiplication (cross products) to find common denominators. This “trick” does not build students’ conceptual understanding and it may	● Students may believe that fractions with more parts represent larger quantities; fractions with less parts represent smaller quantities.

be confusing if they are comparing more than one fraction. • Grade four Integrated STEM standards 4.AM.1 integrates well with this standard.	
Looking Back	**Looking Ahead**
3.NS.5: Compare two fractions with the same numerator or the same denominator by reasoning about their size based on the same whole. Record the results of comparisons with the symbols > , = , or < , and justify the conclusions (e.g., by using a visual fraction model). (E)	**5.NS.1:** Use a number line to compare and order fractions, mixed numbers, and decimals to thousandths. Write the results using > , = , and < symbols. (E)

Instructional Resources

- Implementing the Mathematics Process Standards: Grades Three through Five
- Mathematics Grades 3-5 Vertical Articulation Guide
- Learning Progressions & Content Supports: Grade 3 through Grade 5
- Illustrative Mathematics-Comparing Fractions Using Benchmarks Game
- Illustrative Mathematics-Doubling Numerators and Denominators
- Illustrative Mathematics-Listing Fractions in Increasing Size
- Illustrative Mathematics-Using Benchmarks to Compare
- Tools for Teachers-Fraction Action (Login Instructions)
- Open Middle-Comparing Fractions
- Open Middle-Fractions on a Number Line
- Open Middle-Benchmark Fractions
- Open Middle-Fractions Less than One Half
- Open Middle-Comparing Fractions 2
- Open Middle-Comparing and Identifying Fractions on a Number Line
- Open Up Resources-Fraction Comparison: Lessons 12-17
- Polypad/Amplify-Interactive Fraction Models Tutorials

Universal Supports for All Learners

- 2024 Content Connectors
- Universal Design for Learning Playbook
- UDL Guideline Infographic, from Learning Designed
- UDL Tips from CAST
- Mathematics Learning Recovery Series: Part 2-Addressing the Gaps in Student Learning
- Mathematics Learning Recovery Series: Part 3-Instructional Strategies for All Learners

Instructional Strategies

- What Works Clearinghouse-Concrete-Semi-Concrete-Abstract Video (Print Recommendations)
- What Works Clearinghouse-Clear & Concise Mathematical Language Video (Print Recommendations)

- NYSED-Frayer Vocabulary Model Scaffolding Example & Template
- Magma Math: Math Teaching Practices
- Problem Solving Instructional Support
- WIDA-Doing and Talking Mathematics: A Teachers Guide to Meaning-Making with English Learners
- Virginia Department of Education Students with Disabilities in Mathematics Frequently Asked Questions

Assessment Considerations

- ILEARN Test Blueprint: Mathematics 2025-2026 (Spreadsheet)
- ILEARN Test Blueprint: Mathematics 2025-2026 (PDF)
- IDOE Released Items Repository
- I AM - Indiana's Alternate Measure
- Quality Mathematic Items for Classroom Assessments (Featuring New ILEARN Item Specifications)
- UDL Assessment Strategies

Interdisciplinary Connections

Coming Soon

Disciplinary Literacy

Coming Soon

Contact IDOE's Office of Teaching and Learning with any questions.