Mathematics: Grade 5

Overview

In grade five, the standards in the *Number Sense* domain address topics such as fractions and place value that support standards in the *Computation and Algebraic Thinking* domain. *Number Sense* standards in grade three build understanding of unit fractions using part and whole reasoning,[3.NS.2] and in grade four they relate fractions to equivalent whole numbers and mixed numbers.[4.NS.2] In grade five, students deepen their fraction understanding by applying part and whole reasoning to non-unit fractions and seeing fractions as whole number division.[5.NS.2] By grade six, students are expected to solve real-world problems[6.NS.4] with positive fractions and convert between fractions and decimals.[6.RP.1]

While grade three students use number lines to model non-unit fractions[3.NS.3] and grade four students use number lines to model mixed numbers and improper fractions, grade five students use number lines to compare and order fractions, mixed numbers, and decimals to thousandths.[5.NS.1] In grade six, number lines are used to understand numbers with opposite signs and to order rational numbers in general.[6.NS.2-3]

In grade three, students use place value reasoning to round two- and three-digit numbers to the tens and hundreds,[3.NS.6] and in grade four they round multi-digit whole numbers to any given place value.[4.NS.7] Grade five standards extend place value reasoning as students explain patterns in the number of zeros of the product when multiplying by powers of ten.[5.NS.3] Place value understand is essential as grade five students use all four operations to compute with decimals to the hundredths place.[5.CA.9]

<table>
<tr><th colspan="2">Number Sense</th></tr>
<tr><td>Learning Outcome</td><td>Students explore place value through representing powers of 10 as exponents, modeling percents as parts of 100, and comparing and ordering fractions, mixed numbers, and decimals to the thousandth.</td></tr>
<tr><td>Standard</td><td>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)</td></tr>
<tr><th colspan="2">Evidence Statements</th><th>Academic Vocabulary</th></tr>
<tr><td colspan="2">Use concrete and pictorial models to represent given fractions, mixed numbers, and decimals to the thousandths to assist with comparisons and ordering.
Plot given sets of fractions, mixed numbers, and decimals to the thousandths in order on a number line.
When necessary, convert fractions, mixed numbers, and decimals to common forms to</td><td>Fraction
Mixed number
Decimal
Tenths
Hundredths
Thousandths
Compare
Greater than
Less than</td></tr>
</table>

plot them in order on a number line. ● Make comparisons between given sets of fractions, mixed numbers, and decimals and record results using >, =, and < symbols. ● Justify comparisons, either verbally or in writing, using concrete or pictorial models and a number line.	● Equal to ● Model ● Order
Clarification Statements	**Common Misconceptions**
● Prior to grade five, students have worked with comparing fractions to fractions and decimals to decimals. Students have also calculated decimal equivalents for halves and fourths. This standard brings the concepts of whole number, fraction, and decimal number sense, fraction, decimal equivalency, and the comparison of numbers together. Students should focus on comparing varying-sized sets of whole numbers, fractions, mixed numbers and fractions with and without a number line. ● A key concept of this standard is students' understanding of the size, or magnitude, of the numbers they are ordering and comparing. To do this, students should continue to model fractions, mixed numbers, and decimals using concrete models or pictorial representations. It is important for students to see the size of 1 2/3 compared to 1.5. ● The use of benchmark fractions or decimals continues to be important. Labeling benchmarks (e.g., whole numbers, fourths, halves) will continue to help students navigate the placement of fractions and decimals on the number line. ● If students are comparing or ordering fractions and decimals other than those that are commonly known (e.g., 1/4, 1/2, 3/4, 2/3, 0.25, 0.5, 0.75), students may choose to convert all given numbers to the same form. ● When comparing or ordering a mixture of fractions/mixed numbers and decimals, teachers may have students use a double number line with the same endpoints. Students may plot the fractions/mixed numbers on the top number line and plot the decimals on the bottom number line. This allows students to work with one type of number at a time. Students can then combine	● Students may struggle with writing decimal equivalents of fractions. ● Students may treat decimals as whole numbers when making comparisons.They may consider 0.6 and 0.06 equal. ● Students may think the longer the number, the greater the value. For example, they may consider 0.08 greater than 0.9. ● Students may struggle with understanding the magnitude of a number presented in both fraction and decimal form.

the number lines to include all given numbers.	
Looking Back	**Looking Ahead**
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)	**6.NS.3:** Compare and order rational numbers and plot them on a number line. Write, interpret, and explain statements of order for rational numbers in real-world contexts.

Instructional Resources

- Mathematics Grades 3-5 Vertical Articulation Guide
- Mathematics Grades 5-6 Vertical Articulation Guide
- Learning Progressions & Content Supports: Grade 3 through Grade 5
- Implementing the Mathematics Process Standards: Grades Three through Five
- Math Learning Center-Digital Number Line
- Illustrative Mathematics-Are These Equivalent to 9.52?
- Illustrative Mathematics-Drawing Pictures to Illustrate
- Illustrative Mathematics-Comparing Decimals on the Number Line
- Illustrative Mathematics-Placing Thousandths on the Number Line
- Graham Fletcher-3 Act Math Task: Final Lap
- Graham Fletcher-3 Act Math Task: Chasing Gold
- Ordering Decimals, Fractions, and Mixed Numbers Video
- Open Up Resources-Numbers to the Thousandths: Lessons 5, 6, and 9

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.