Mathematics: Grade 3

Overview

The *Computation and Algebraic Thinking* standards call for fluency with addition and subtraction within 20 in grade one[1.CA.1], and to solve real-world problems within 100 in grade two.[2.CA.1] Grade three standards require that students fluently add and subtract multi-digit whole numbers.[3.CA.1] By grade four, students add and subtract fractions and mixed numbers with common denominators,[4.CA.6-7] and in grade five they add and subtract fractions with unlike denominators[5.CA.3] and add and subtract decimals to the hundredths place.[5.CA.9]

Grade three standards introduce multiplication and division and begin to build an understanding of their properties and the relationships between these two operations.[3.CA.3-4] The multiplication and division situations students encounter in grade three primarily involve *equal groups* or *arrays*. These may include problem types including *unknown product*, *unknown group size*, or *unknown number of groups*. Array situations are generally shown by rows and columns and the language around these can be challenging, but this thinking is supported by earlier standards such as 2.G.3 which has students partition a rectangle into rows and columns. This learning relies on additive operations in earlier grades that give access to multiplication as repeated addition, and on skip counting experiences from kindergarten through grade two, which also support learning about factors and multiples.

Grade three students are expected to be fully fluent with multiplication and division facts from 0 to 10[3.CA.6] and to solve multiplication and division problems within 100 using various strategies.[3.CA.5] Multiplicative *comparison* problems are generally more complex and are addressed in grade four standards.[4.CA.5] By grade five, students are expected to solve-real world problems involving multiplication and division of any whole number.[5.CA.2] While the idea of multiplication in grade three is based on equal groups that are entirely discrete and could be accessed by repeated addition, these ideas grow over the 3-5 band as multiplication is seen as more continuous, particularly in ‘times as much’ problems where multiplication has a scaling effect of stretching or shrinking.

<table>
<tr><th colspan="2">Computation and Algebraic Thinking</th></tr>
<tr><td>Learning Outcome</td><td>Students use modeling and conceptual strategies to multiply and divide numbers within 100 in real-world situations. Students apply concepts and strategies of addition and subtraction to solve real-world problems, and investigate number patterns through the application of concepts of multiplication and more complex concepts of addition within 100.</td></tr>
<tr><td>Standard</td><td>3.CA.8: Create, extend, and give an appropriate rule for number patterns within 100 (including patterns in the addition table or multiplication table).</td></tr>
<tr><th colspan="2">Evidence Statements</th><th>Academic Vocabulary</th></tr>
<tr><td colspan="2">• Recognize numerical patterns in everyday</td><td>• Rule</td></tr>
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situations. ● Identify numerical patterns and the appropriate rule for the pattern in addition and multiplication tables. ● Interpret given number patterns of addition and subtraction to identify the appropriate rule and unknown numbers for the pattern. ● Interpret given number patterns of multiplication and division to identify the appropriate rule and unknown numbers for the pattern. ● Identify an appropriate rule to create a pattern within 100. ● Extend patterns based on an identified rule.	● Number pattern ● Addition table ● Multiplication table
Clarification Statements	**Common Misconceptions**
● Students should have frequent opportunities to observe and identify numerical patterns both in mathematics and in their surrounding environment. ● Teachers should provide structured opportunities for students to investigate, discuss, and identify patterns found in addition tables or the multiplication table. Students should mathematically justify any patterns they identify. ● Examples of patterns students should recognize and be able to justify in grade three include but are not limited to: ○ The sum of any two even numbers is even. ○ The sum of any two odd numbers is even. ○ The sum of any odd and even number is odd. ○ Multiples of 4, 6, 8 and 10 are all even because they can be decomposed into two equal groups. ● Students should record patterns in tables, identify the pattern or rule, and extend the pattern using the rule. ● Once students have had ample opportunities to work with patterns at this level, students should begin to create, discuss, and justify their own patterns. ● Grade three Integrated STEM standards 3.CC.2, 3.CC.5, 3.DM.2, and 3.AM.1 integrate well with this standard.	● Students may believe patterns must always be repeating. ● Students may believe patterns cannot be made using number sequences. ● Students may believe that the first number or pattern identified will continue to repeat. ● Students may believe the pattern rule does not relate to extending the pattern. ● Students may apply the incorrect operation to extend a pattern (e.g., addition instead of multiplication).

Looking Back	Looking Ahead
2.CA.4: Create, extend, and give an appropriate rule for number patterns using addition and subtraction within 1,000.	**4.CA.9:** Describe the relationship between two terms and use it to find a second number when a first number is given. Generate a number pattern that follows a given rule.

Instructional Resources

- Implementing the Mathematics Process Standards: Grades Three through Five
- Mathematics Grades 2-3 Vertical Articulation Guide
- Mathematics Grades 3-5 Vertical Articulation Guide
- Learning Progressions & Content Supports: Grade 3 through Grade 5
- Illustrative Mathematics-Addition Patterns
- Illustrative Mathematics-Symmetry of the Addition Table
- Illustrative Mathematics-Making a Ten
- Illustrative Mathematics-Patterns in the Multiplication Table
- Inside Mathematics-Houses in a Row
- Inside Mathematics-Tri-Triangles
- PHET Interactive Simulations: Function Builder
- Tools for Teachers-Patterns in the Input Output Model (Login Instructions)
- Tools for Teachers-Cookies After the Race (Login Instructions)
- Tools for Teachers-Addition Patterns (Login Instructions)
- NRICH Mathematics-Transformations Tables

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.