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.

Algebra I Predecessor Skills

Algebra I is a key predictor of long-term academic success, strongly linked to graduation rates, college opportunities, and future earning potential. Unfortunately, many students start Algebra I with substantial learning gaps, particularly in foundational algebra-related skills from prior grades. The TNTP report Unlocking Algebra reveals that many students begin Algebra I without mastery of foundational skills—known as **Algebra I Predecessor Skills**—introduced in earlier grades. Of particular importance are a subset of the Predecessor Skills located in grades six through eight, known as the **Algebra I Key Predecessor Skills**. Students who have mastered the Algebra I Predecessor Skills—shown to be the most predictive of success—are nearly six times more likely to grasp targeted grade-level Algebra I content. The 2023 Mathematics Instructional Frameworks have been updated to identify standards that correlate with Algebra I Key Predecessor Skills and Predecessor Skills in grades three through eight. Mastery of these targeted skills significantly boosts the likelihood of learning grade-level content and provides targeted Tier 2 support to accelerate student achievement and ensures that students can meaningfully engage with grade-level Algebra I material. To learn more about the Algebra Predecessor Skills, visit the TNTP Unlocking Algebra: Algebra 1 Predecessor Skills Guide.

Number Sense			
Standard	**4.NS.1:** Read and write whole numbers up to 1,000,000. Use words, models, standard form, and expanded form to represent and show equivalent forms of whole numbers up to 1,000,000.		
Algebra I	☐ **Key Predecessor Skill**	☐ **Predecessor Skill**	☑ **Not Applicable**

Evidence Statements	Academic Vocabulary
● Read numbers up to 1,000,000 orally. ● Write numbers up to 1,000,000 in standard form. ● Write the word form of numbers up to 1,000,000. ● Write the place value in word form of numbers up to 1,000,000. ● Use knowledge of place value to determine the value of each digit in numbers up to 1,000,000. ● Use knowledge of place value to model numbers up to 1,000,000. ● Use knowledge of place value to write numbers up to 1,000,000 in expanded form. ● Use knowledge of place value flexibly to write equivalent forms of numbers up to 1,000,000 in expanded form.	● Standard form ● Word form ● Expanded form ● Digit ● Value ● Equivalent ● Place value
Clarification Statements	**Common Misconceptions**
● Students build on their previous work with numbers up to 10,000 in grade three. This is the culminating standard of place value work with whole numbers. ● While drawings, concrete manipulatives, and virtual models are important, frequent use of a place value chart is preferred for larger numbers. ● Teachers should model and students should be expected to read numbers correctly. The use of place value charts helps students learn the logical structure of numbers. To read a larger number, students should first segment it into groups of three digits from the right to left. Students then read each group from left to right, stopping at the end of each to name	● Students may ignore or misunderstand an internal zero in a multi-digit number. Students may represent eight hundreds and three ones as 83 or 830 or have difficulty reading numbers such as 6,008 correctly. ● When given the place value of a digit in a random order, students may write the number as given, left to write. For example, a student may write three ones, nine thousands, zero tens, and one hundred as 3,901. ● Students may miscalculate the value of the thousands block to be 600 by counting the faces and multiplying them by 100.

the unit. Students should not insert the word “and” when reading any whole number. For example: ○ 118,234 ○ Mark groups of three from the right to left: 118 | 234 ○ Read from left to right: “one hundred eighteen thousand, two hundred thirty-four ● Numbers should be written in a variety of formats: ○ Standard form: 118,723 ○ Word form: one hundred eighteen thousand, seven hundred twenty-three ○ Expanded form: 100,000 + 10,000 + 8000 + 700 + 200 + 3 ○ Word form of place value: one hundred thousand, one ten thousand, eight thousands, seven hundreds, two tens, three ones ● Students should think flexibly about numbers, in this case, the decomposition of numbers, and model their values in multiple ways. For example, 118,723 can be modeled as 118,723 ones, OR 11872 tens and 3 ones, OR 1187 hundreds, 23 ones, OR 118 thousands, 7 hundreds, 2 tens, and 3 ones or multiple other ways. Flexibility with numbers leads to greater number sense and supports essential computational understandings. ● Grade four Integrated STEM standard 4.AM.1 integrates well with this standard.	
Suggested Models	**Suggested Manipulatives**
Coming Soon	*Coming Soon*
Looking Back	**Looking Ahead**
3.NS.1: Read and write whole numbers up to 10,000. Use words, models, standard form, and expanded form to represent and show equivalent forms of whole numbers up to 10,000.	This concept is not specifically addressed in the Indiana Academic Standards in subsequent grade levels.
Prior Knowledge Skills	
● Understand the value of 0. ● Understand that 10 ones = 10.	

- Understand that 10 tens = 100.
- Understand that 10 hundreds = 1,000.
- Understand that 10 thousands = 10,000
- Recognize and read numbers from 1-10,000.
- Write number words from 1-10,000.
- Identify the value of each digit in any number 1-10,000.
- Identify and write the expanded form of numbers from 1-10,000.
- Model numbers 1-10,000 using base ten blocks, place value disks, and/or place value cards.
- Match the standard form, word form, and expanded form of any number 1-10,000.
- Write the standard form, word form, and expanded form of any number 1-10,000.

Proficiency Level Progression			
Below Proficiency: Identify or write the **expanded form** of a number (up to 1,000,000) from a given model.	**Approaching Proficiency:** Identify or write the **standard form** of a number (up to 1,000,000) when given that number as a model or in expanded form.	**At Proficiency:** Identify, write, or model a number (up to 1,000,000) in **any equivalent form** of the number.	**Above Proficiency:** Apply place value understanding to identify, write, or model equivalent forms of numbers (up to 1,000,000) i**n various groupings based on place value.**
The skills listed in each Proficiency Level should carry over into or support the other Proficiency Levels. ● Identify the name of each place value position to the millions place. ● Understand that 10 thousands = 10,000. ● Understand that 10 hundred thousands= 1,000,000. ● Understand the role of zero in any number up to 1,000,000 and how it is represented in a model and in expanded form. ● Identify the value of a base ten model representing a	● Read numbers up to 1,000,000 orally. ● Make connections between the model and expanded form of a number up to 1,000,000 to the written digits of the number in standard form. ● Understand that each digit of a number up to 1,000,000 represents the place value of that digit. ● Match a number written in standard form to pictorial representations of models or the expanded form of the number. ● Write the standard form of a number	● Fluidly connect the standard, expanded, and word forms, and a model (pictorial or physical) of a number up to 1,000,000. (e.g. standard to pictorial; expanded to word; etc.) ● Construct a model of a number up to 1,000,000 using manipulatives (physical or virtual) when given in standard, word, or expanded form. ● Identify and write the word form of numbers up to 1,000,000.	● Construct equivalent models of numbers up to 1,000,000 as combinations of thousands, hundreds, tens, and ones. ● Write the expanded form of numbers up to 1,000,000 as combinations of thousands, hundreds, tens, and ones. ● Represent a number using a non-traditional expanded form and a model. (Ex. 24 ten thousands, 13 hundreds, 56 tens)

number up to 10,000, correlating each type of block to the correct place value position. (example: 4 flats = 400, 3 rods = 30, and 2 unit cubes = 2) ● Match the model of a number up to 1,000,000 using a place value mat. ● Write the expanded form of a number up to 1,000,000 from a given model.	from a given model (physical or pictorial) or expanded form of the number. ● Write the standard form of a number given in non-traditional expanded form. (example: 90 + 100,000 + 6 + 400 + 20,000)		

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-Thousands and Millions of Fourth Graders,
- Illustrative Mathematics-Threatened and Endangered
- Game: Place Value Pickle
- Ten Times Greater Video
- Tools for Teachers-Tens Talk-n-Roll (Login Instructions)
- Open Up Resources-Place Value Relationships through 1,000,000

Universal Supports for All Learners

- 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

Tiered Supports and Strategies	
Tier II	**Tier III**
Coming Soon	*Coming Soon*
Assessment Considerations	
● Indiana Assessment Framework: Mathematics ● 4.NS.1 ILEARN Item Specification ● ILEARN Released Items Repository ● Quality Mathematic Items for Classroom Assessments (Featuring New ILEARN Item Specifications)	

Contact the Indiana Department of Education with any questions.