2.NBT:NUMBER & OPERATIONS IN BASE TEN

Cluster Statement: A: Understand place value.

Major Cluster (Students should spend the large majority of their time (65-85%) on the major work of the grade/course. Supporting work and, where appropriate, additional work should be connected to and engage students in the major work of the grade.)

Standard Text	Standard for Mathematical Practices	Students who demonstrate understanding can:
2.NBT.A.1 Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones, e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases: • 2.NBT.A.1.A: 100 can be thought of as a bundle of ten tens — called a "hundred." • 2.NBT.A.1.B: The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).	SMP 7: Students look for and make use of structure that each hundred is that number of hundreds (100 is 1 hundred) with 0 tens and 0 ones. SMP 8: Students look for and express regularity in repeated reasoning by understanding that every time they have 10 of a particular item, they group it to make the next place value unit.	• Count by 10s, ten 10s equals 100, ten 1's equals 10. • Explain the names of places (ones, tens, hundreds) and how the place impacts the value of the digit. • Explain the difference and relationship between value and place. • Use base ten blocks to model numbers. • Represent place values with pictures or representations. • Utilize a place value chart to determine and identify places and values for digits in a three-digit number. **Depth Of Knowledge:** 1 **Bloom's Taxonomy:** understand
2.NBT.A.2 Count within 1000; skip-count by 5s, 10s, and 100s.	SMP 7: Students look for and make use of structure by using known patterns and facts. SMP 8: Students look for and express regularity in repeated reasoning when skip counting as a pattern of regularity.	• Count using a 100 chart or number line to explain patterns and to skip count to 1000 by 5s, 10s, and 100's. • Write in or verbally say missing numbers in a skip counting pattern • Describe place value patterns when skip counting **Depth of Knowledge:** 1

		Bloom's Taxonomy: understand
Standard Text 2.NBT.A.3 Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.	**Standard for Mathematical Practices** SMP 7: Students look for and make use of structure of base-ten numeral, number name, and expanded form patterns.	**Students who demonstrate understanding can:** • Explain the difference between expanded form and standard form. • Write numbers out with words. • Read and write numbers up to 1,000 using base-ten numerals (e.g., 234) • Read and write numbers up to 1,000 using number names (e.g., two hundred thirty-four). • Read and write numbers using expanded form (e.g., 200 + 30 + 4). • Decompose numbers using expanded form. • Record number decompositions in various ways (i.e. 234 as 230 + 4, 199 + 35, 200 + 34, or 225 + 14)
		Depth of Knowledge: 1
		Bloom's Taxonomy: understand, apply
Standard Text 2.NBT.A.4 Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons.	**Standard for Mathematical Practices** SMP 2: Students reason abstractly and quantitatively through comparisons and recording with symbols. SMP 3: Students construct viable arguments and critique the reasoning of others by defining place value in the digits. SMP 7: Students look for and make use of structure of place value for three-digit numbers.	**Students who demonstrate understanding can:** • Compare two three-digit numbers. • Use inequality symbols to write comparisons about two three-digit numbers. • Explain how two numbers compare based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols.
		Depth of Knowledge: 1-2

		Bloom's Taxonomy: understand, apply
Previous Learning Connections • Connect to students will count to 120, starting with any number less than 120. **(1.NBT.1)** • Connect to understand place value of ones and tens in two-digit numbers. **(1.NBT.2)**	**Current Learning Connections** • Connect the skills from within this cluster to represent and solve addition and subtraction, 2-step word problems. **(2.OA.1)**	**Future Learning Connections** • Connect to interpret the products of whole numbers, such as interpreting 7 x 5 as the total number of objects in 7 groups of 5 objects each. **(3.OA.1**) • Connect to use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities. **(3.OA.3)**

Clarification Statement:

In second grade, students continue to develop a deep understanding of **place value** and use that understanding to add and subtract within 1,000. This cluster focuses on the development of place value up to and beyond 100. Students should use the structure of building **tens** out of 10 ones, building **hundreds** out of 10 tens, and building a **thousand** out of 10 hundreds. This is the structure of our **base-ten** place value system. It is built on repeated reasoning that every time you have 10 of a particular item, you group it to make the next place value **unit**. Students use precision in describing their work with appropriate vocabulary and reading numbers accurately. They explain their reasoning to classmates throughout the cluster and compare their thinking with that of their peers.

Common Misconceptions

Students may struggle with grouping or bundling, one-to-one correspondence, or skip-counting which will impact their work with place value.

Students may confuse directionality of symbols, thus leading to an incorrect comparison of numbers.

Multi-Layered System of Supports (MLSS)/Suggested Instructional Strategies

    Pre-Teach

        Pre-teach (targeted): *What pre-teaching will prepare students to productively struggle with the mathematics for this cluster within your HQIM?*
- For example, some learners may benefit from targeted pre-teaching that analyzes common misconceptions when studying understanding place value because many students struggle with understanding the connection between the place and the value. For example, students can name that the 5 is in the tens place in 653, but then when asked about values they still might say 5. Strategic and purposeful instruction regarding the most common misconceptions can benefit students.

        Pre-teach (intensive): *What critical understandings will prepare students to access the mathematics for this cluster?*
- 1NBT.B2: This standard provides a foundation for work with understanding place value because it teaches the difference between ones and tens. If students have unfinished learning within this standard, based on assessment data, consider ways to provide intensive pre-teaching support prior to the start of the unit to ensure students are ready to access grade level instruction and assignments.

    Core Instruction

Access

Perception: *How will the learning for students provide multiple formats to reduce barriers to learning, such as providing the same information through different modalities (e.g., through vision, hearing, or touch) and providing information in a format that will allow for adjustability by the user?*

- For example, learners engaging with understanding place value will benefit when learning experiences ensure information is accessible to learners with sensory and perceptual disabilities, but also easier to access and comprehend for many others such as offering alternatives for visual information such as text or spoken for all images, graphics, video, or animations; touch equivalents (tactile graphics or objects of reference) for key visuals that represent concepts; objects and spatial models to convey perspective or interaction; auditory cues for key concepts and transitions in visual information because allowing students to manipulate objects will help students understand the idea of bundles. Students can manipulate base ten block or mock money.

Build

Effort and Persistence: *How will the learning for students provide options for sustaining effort and persistence?*

- For example, learners engaging with understanding place value will benefit when learning experiences attend to students attention and affect to support sustained effort and concentration such as providing alternatives in the mathematics representations and scaffolds because students will begin to see connections between the different places and values which will benefit them as they approach higher grade level work that requires the foundation of place value understanding.

Language and Symbols: *How will the learning for students provide alternative representations to ensure accessibility, clarity and comprehensibility for all learners? (e.g., a graph illustrating the relationship between two variables may be informative to one learner and inaccessible or puzzling to another; picture or image may carry very different meanings for learners from differing cultural or familial backgrounds)*

- For example, learners engaging with understanding place value will benefit when learning experiences attend to the linguistic and nonlinguistic representations of mathematics to ensure clarity can comprehensibility for all learners such as making connections to previously learned structures> because the number system is based on the number 10 and when students understand that concept they are able to make connections into decimal systems later.

Expression and Communication: *How will the learning provide multiple modalities for students to easily express knowledge, ideas, and concepts in the learning environment?*

- For example, learners engaging with understanding place value benefit when learning experiences attend to the multiple ways students can express knowledge, ideas, and concepts such as using physical manipulatives (e.g., blocks, 3D models, base-ten blocks) because students can manipulate groups of 10 and 100 to assist in understanding the value of the next place.

Internalize

Executive Functions: *How will the learning for students support the development of executive functions to allow them to take advantage of their environment?*

- For example, learners engaging with understanding place value benefit when learning experiences provide opportunities for students to set goals; formulate plans; use tool and processes to support organization and memory; and analyze their growth in learning and how to build from it such as embedding prompts to "show and explain your work" (e.g., portfolio review, art critiques) because students need to be able to explain their

understanding of the whole place value system and go beyond naming places from memorization.

Re-teach

Re-teach (targeted): *What formative assessment data (e.g., tasks, exit tickets, observations) will help identify content needing to be revisiting during a unit?*

- For example, students may benefit from re-engaging with content during a unit on understanding place value by examining tasks from a different perspective through a short mini-lesson because students may need to view the number as money, or view the number as a quantity so that they can truly understand the meaning of all digits in a number.

Re-teach (intensive): *What assessment data will help identify content needing to be revisited for intensive interventions?*

- For example, some students may benefit from intensive extra time during and after a unit understanding place value by addressing conceptual understanding because students need to be clear that the number system is based on the number 10. Extra time can be spent showing the relationship between the number one, ten and hundred.

Extension

What type of extension will offer additional challenges to 'broaden' your student's knowledge of the mathematics developed within your HQIM?

- For example, some learners may benefit from an extension such as open-ended tasks linking multiple disciplines when studying understanding place value because students can link their ideas to real word situations with comparing numbers.

Culturally and Linguistically Responsive Instruction:

Validate/Affirm: How can you design your mathematics classroom to intentionally and purposefully legitimize the home culture and languages of students and reverse the negative stereotypes regarding the mathematical abilities of students of marginalized cultures and languages?

Build/Bridge: How can you create connections between the cultural and linguistic behaviors of your students' home culture and language the culture and language of school mathematics to support students in creating mathematical identities as capable mathematicians that can use mathematics within school and society?

Using and Connecting Mathematical Representations: The standard for mathematical practice, use appropriate tools strategically, provides a strong foundation to validate and bridge for students. Mathematical representations are mathematical tools. The linguistic and cultural experiences of students provide different and varied types of representations for solving mathematical problems. By explicitly encouraging students to use multiple mathematical representations students can draw on their "mathematical, social, and cultural competence". By valuing these representations and discussing them we can connect student representations to the representations of school mathematics and build a bridge for students to position them as competent and capable mathematicians. For example, when studying understanding place value, the use of mathematical representations within the classroom is critical because although money is a good representation for place value, it may not be the entry point for all students. Students should be encouraged to use a variety of representations for place value including drawing bundles, grouping items, blocks or tiles.

Standards Aligned Instructionally Embedded Formative Assessment Resources:

Source: http://tasks.illustrativemathematics.org/content-standards/2/NBT/A/1/tasks/192

This type of assessment question requires students to understand the value of digits, not just the place they are in. They need to understand the difference and relationship between value and place. SMP 7 Look for and make use of structure is important because students need to understand structure of 3-digit number; place of digit and value of each.

This task allows you to assess student's ability to break apart and put together numbers (ones to tens and tens to hundreds). They also must understand comparing numbers, equal to hundreds (fill a box). The tasks increase in difficulty and therefor give a breakdown of where struggling student needs support.

Relevance to families and communities:	**Cross-Curricular Connections:**
During a unit focused on understanding place value consider options for learning from your families and communities the cultural and linguistic ways this mathematics exists outside of school to create stronger home to school connections for students, for example, learning about different places that students see numbers in their communities and real life situations can help them connect to the true meaning of the value of a number.	Physical Education: Students can practice skip counting while keeping track of their repetitions when doing activities such as jumping rope.