

## 2.NBT: NUMBER & OPERATIONS IN BASE TEN

**Cluster Statement:** Use place value understanding and properties of operations to add and subtract.

**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.)

<p><b>Standard Text</b></p> <p><b>2.NBT.B.5</b> <b>Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.</b></p>	<p><b>Standard for Mathematical Practices</b></p> <p>SMP 2: Students reason abstractly and quantitatively by looking at properties of operations and the relationships of addition and subtraction.</p> <p>SMP 6: Students attend to precision when using knowledge of place value, properties of operations, and/or the relationship between addition and subtraction.</p> <p>SMP 7: Students look for and make use of structure of place value and/or the relationship between addition and subtraction.</p>	<p><b>Students who demonstrate understanding can:</b></p> <ul style="list-style-type: none"> <li>• Apply different strategies to add and subtract within 100.</li> <li>• Explain the relationship between addition and subtraction to solve problems.</li> <li>• Explain different strategies for adding and subtracting.</li> <li>• Use place value to add and subtract.</li> <li>• Create concrete models, or drawings and the following strategies to add within 100; place value, properties of operations and the relationship between adding and subtracting.</li> <li>• Utilize number lines, blocks, or items to find unknown numbers.</li> </ul> <p><b>Depth of Knowledge:</b> 1-2</p> <p><b>Bloom’s Taxonomy:</b> understand, apply</p>
<p><b>Standard Text</b></p> <p><b>2.NBT.B.6</b> <b>Add up to four two-digit numbers using strategies based on place value and properties of operations.</b></p>	<p><b>Standard for Mathematical Practices</b></p> <p>SMP 6: Students attend to precision when using knowledge of place value, properties of operations, and/or the relationship between addition and subtraction.</p> <p>SMP 7: Students look for and make use of structure when adding based on place value and properties of operations.</p>	<p><b>Students who demonstrate understanding can:</b></p> <ul style="list-style-type: none"> <li>• Model addition using number lines, base ten blocks or other objects, and hundreds charts.</li> <li>• Add up to four two-digit numbers</li> <li>• Explain strategies for adding multiple two-digit numbers.</li> <li>• Explain why addition and subtraction strategies work for adding four two-digit numbers, by citing place value and the properties of operations.</li> </ul>

		<p><b>Depth of Knowledge:</b> 1-2</p> <hr/> <p><b>Bloom's Taxonomy:</b> understand, apply</p>
<p><b>Standard Text</b></p> <p><b>2.NBT.B.7</b>  <b>Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.</b></p>	<p><b>Standard for Mathematical Practices</b></p> <p>SMP 2: Students reason abstractly and quantitatively as adding and subtracting within 1000 using models, drawings, and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.</p> <p>SMP 3: Students construct viable arguments and critique the reasoning of others when justifying the reasoning used with a written explanation.</p> <p>SMP 6: Students attend to precision when using knowledge of place value, properties of operations, and/or the relationship between addition and subtraction. using concrete models or drawings to add and subtract within 1000.</p>	<p><b>Students who demonstrate understanding can:</b></p> <ul style="list-style-type: none"> <li>• Use models to add and subtract within 1000.</li> <li>• Explain the relationship between addition and subtraction and use the relationship to solve problems.</li> <li>• Apply place value understanding to add and subtract each place value. Explain different strategies for adding and subtracting.</li> <li>• Utilize concrete models or drawings and the following strategies to add within 1000; place value, properties of operations and the relationship between adding and subtracting.</li> </ul> <hr/> <p><b>Depth of Knowledge:</b> 1-2</p> <hr/> <p><b>Bloom's Taxonomy:</b> understand, apply</p>
<p><b>Standard Text</b></p> <p><b>2.NBT.B.8</b>  <b>Mentally add 10 or 100 to a given number 100-900, and mentally subtract 10 or 100 from a given number 100-900.</b></p>	<p><b>Standard for Mathematical Practices</b></p> <p>SMP 7: Students look for and make use of structure that the only place value that changes is the tens or hundreds place when mentally adding 10 or 100 to a given number.</p> <p>SMP 8: Students look for and express regularity in repeated reasoning when the only place value that changes is the tens or hundreds place when mentally adding 10 or 100 to a given number.</p>	<p><b>Students who demonstrate understanding can:</b></p> <ul style="list-style-type: none"> <li>• Use place value to mentally add 10 or 100 from any number 100-900.</li> <li>• Mentally subtract 10 or 100 from any number 100-900 using place value.</li> </ul> <hr/> <p><b>Depth of Knowledge:</b> 1-2</p> <hr/> <p><b>Bloom's Taxonomy:</b> understand, apply</p>

<p><b>Standard Text</b></p> <p><b>2.NBT.B.9</b> <b>Explain why addition and subtraction strategies work, using place value and the properties of operations.</b></p>	<p><b>Standard for Mathematical Practices</b></p> <p>SMP 3: Students construct viable arguments and critique the reasoning of others to explain why addition and subtraction strategies work.</p>	<p><b>Students who demonstrate understanding can:</b></p> <ul style="list-style-type: none"> <li>• Explain using place value</li> <li>• Apply properties of addition and subtraction</li> <li>• Explain why the addition and subtraction strategies work</li> </ul> <p><b>Depth of Knowledge:</b> 1-2</p> <p><b>Bloom’s Taxonomy:</b> understand, apply</p>
<p><b>Previous Learning Connections</b></p> <ul style="list-style-type: none"> <li>• Connect to add with one- and two-digit numbers and multiples of 10 within 100 using models and strategies and use the concepts of place value, properties of operations, and the relationship between addition and subtraction. <b>(1.NBT.4) (1.NBT.5)</b></li> <li>• Connect to subtract by units of 10 using properties of operations, place value, and addition/subtraction relationship. <b>(1.NBT.6)</b></li> <li>• Connect to apply properties of operations as strategies to add and subtract. <b>(1.OA.3)</b></li> <li>• Connect to understanding subtraction as an unknown-addend problem. <b>(1.OA.4)</b></li> </ul>	<p><b>Current Learning Connections</b></p> <ul style="list-style-type: none"> <li>• Connect to represent and solve addition and subtraction, 2-step word problems within 100. <b>(2.OA.1)</b></li> <li>• Connect to fluently add and subtract within 20 using mental strategies. <b>(2.OA.2)</b></li> <li>• Connect to understanding that the three digits of a three-digit number represent specific amounts <b>(2.NBT.1)</b>.</li> <li>• Connect to fluently and subtract within 100 using strategies, place value, and relationship between addition and subtraction <b>(2.NBT.5)</b>.</li> <li>• Connect to using addition and subtraction within 100 to solve word problems involving lengths <b>(2MD.5)</b></li> </ul>	<p><b>Future Learning Connections</b></p> <ul style="list-style-type: none"> <li>• Connect to solve two-step word problems. <b>(3.OA.8)</b></li> <li>• Connect to fluently add and subtract within 1,000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction. <b>(3.NBT.2)</b></li> </ul>
<p><b>Clarification Statement:</b> In 2nd grade, students use place value understanding and properties of operations to add and subtract. They also use strategies based on number sense, mental mathematics, and the relationship between addition and subtraction to solve problem situations with sums to 100.</p>		
<p><b>Common Misconceptions</b> Students with difficulties with place value reasoning skills may have difficulty regrouping when solving addition and subtraction algorithms.</p>		
<p><b>Multi-Layered System of Supports (MLSS)/Suggested Instructional Strategies</b></p> <p><b>Pre-Teach</b></p> <p>Pre-teach (targeted): <i>What pre-teaching will prepare students to productively struggle with the mathematics for this cluster within your HQIM?</i></p> <ul style="list-style-type: none"> <li>• For example, some students may benefit from targeted pre-teaching that provides additional time for confusion to happen with new mathematical ideas when studying place value and properties of operations to add and subtract because making the jump from identifying places and values to adding and subtracting may take additional time. In</li> </ul>		

addition, students need time to find entry points for word problems and real-life contexts.

Pre-teach (intensive): What critical understandings will prepare students to access the mathematics for this cluster?

- 1 NBT.C 4: This standard provides a foundation for work with place value understanding and properties of operations to add and subtract because if students can add within 100 their connections to adding within 1,000 will be smoother. 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*

Physical Action: *How will the learning for students provide a variety of methods for navigation to support access?*

- For example, students engaging with using place value understanding and properties of operations to add and subtract benefit when learning experiences ensure information is accessible to students through a variety of methods for navigation, such as varying methods for response and navigation by providing alternatives to requirements for rate, timing, speed, and range of motor action with instructional materials, physical manipulatives, and technologies; physically responding or indicating selections; physically interacting with materials by hand, voice, single switch, joystick, keyboard, or adapted keyboard because some students may need to draw out representations of the place value to assist with addition and subtraction. It is essential student understand beyond "crossing off and borrowing" and drawing it out or physically manipulating place value tools may help the concepts of understanding the process of regrouping.

#### *Build*

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

- For example, students engaging using place value understanding and properties of operations to add and subtract benefit when learning experiences attend to students attention and affect to support sustained effort and concentration such as providing feedback that is frequent, timely, and specific because misunderstandings frequently practiced can result in students needing to "unlearn" a procedure or understanding.

Language and Symbols: *How will the learning for students provide alternative representations to ensure accessibility, clarity and comprehensibility for all students? (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 students from differing cultural or familial backgrounds)*

- For example, students engaging with using place value understanding and properties of operations to add and subtract benefit when learning experiences attend to the linguistic and nonlinguistic representations of mathematics to ensure clarity can comprehensibility for all students such as making connections to previously learned structures because students that understand the value of the places and bundles can make a stronger connection to the concept of regrouping.

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, students engaging with using place value understanding and properties of operations to add and subtract benefit when learning experiences attend to the multiple ways students can express knowledge, ideas, and concepts such as solving problems using a variety of strategies because there are different ways to add and subtract

numbers within 1000 such as traditional, breaking apart place value and decomposing numbers.

*Internalize*

Self-Regulation: *How will the design of the learning strategically support students to effectively cope and engage with the environment?*

- For example, students engaging with using place value understanding and properties of operations to add and subtract benefit when learning experiences set personal goals that increase ownership of learning goals and support healthy responses and interactions (e.g., learning from mistakes), elevating the frequency of self-reflection and self-reinforcements because students can benefit from knowing and understanding the most common errors students make within this cluster, and reflecting on their most common errors.

**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 properties of operations to add and subtract by revisiting student thinking through a short mini-lesson because it will be helpful to determine if students have a grasp of the basic place value system before expecting addition and subtraction with larger numbers.

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 on using place value understanding and properties of operations to add and subtract by confronting student misconceptions because students may still need clarification regarding the meaning of regrouping. It is imperative students understand what they are taking or giving when they apply the process of regrouping.

**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 students may benefit from an extension such as the opportunity to understand concepts more quickly and explore them in greater depth than other students when studying understanding and properties of operations to add and subtract because students can benefit from the chance to determine reasonability of their answers using what they know about place value. For example, students can explore estimation strategies.

**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?

Tasks: The type of mathematical tasks and instruction students receive provides the foundation for students' mathematical learning and their mathematical identity. Tasks and instruction that provide greater access to the mathematics and convey the creativity of mathematics by allowing for multiple solution strategies and development of the standards for mathematical practice lead to more students viewing themselves

mathematically successful capable mathematicians than tasks and instruction which define success as memorizing and repeating a procedure demonstrated by the teacher. For example, when studying using place value understanding and properties of operations to add and subtract because there are multiple ways to add and subtract including traditional method, breaking apart place value and decomposing numbers. Students should be encouraged to explore different methods, compare methods and choose methods that promote their success. Students should be encouraged to articulate how methods are related.

**Standards Aligned Instructionally Embedded Formative Assessment Resources:**

Source: <http://tasks.illustrativemathematics.org/content-standards/2/NBT/B/7/tasks/1063>

This type of assessment question requires students to understand different strategies can be used to fluently add and subtract. Numbers can be decomposed into many values. Students can use the relationship between addition and subtraction to solve problems. Students can explain different strategies for solving. SMP 6 Attend to precision is important when using knowledge of place value, properties of operations, and/or the relationship between addition and subtraction

This task allows you to assess students understanding of place value and understanding of addition and subtraction.

**Relevance to families and communities:**

During a unit focused on using place value understanding and properties of operations to add and subtract 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 when in real life situations students may be required to add and subtract can give students a sense of connection and understanding.

**Cross-Curricular Connections:**

Science: Students can mentally add and subtract measurements rounded to the nearest ten or one hundred.