NEW MEXICO
Public Education Department

1.NBT: NUMBER & OPERATIONS IN BASE TEN

Cluster Statement: C: 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.)

Standard Text	**Standard for Mathematical Practices**	**Students who demonstrate understanding can:**
1.NBT.C.4: Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, 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 and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.	SMP 2: Students can reason abstractly and quantitatively by asking themselves if their answers are reasonable by reflecting on the value of the numbers and using strategies based on number sense. SMP 4: Students can model with mathematics by modeling additional examples with sums to 100 using concrete materials, pictures, and lastly numerals.	• Explain addition within 100 adding a two-digit number and a one-digit number using physical models, drawings, hundred charts, and number lines. • Explain addition within 100 adding a two-digit number and a multiple of ten number using physical models, drawings, hundred charts, and number lines. • Explain addition within 100 adding a two-digit number and a two-digit number using physical models, drawings, hundred charts, and number lines. • Use partial sums by decomposing both addends to add within 100. • Use partial sums by decomposing one addend to add within 100. • Explain why a new ten is sometimes made when adding numbers.
		Depth of Knowledge: 1-3
		Bloom's Taxonomy: Understand, Apply, Analyze and Evaluate

<table>
<tr>
<td rowspan="3">Standard Text

1.NBT.C.5: Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.</td>
<td rowspan="3">Standard for Mathematical Practices

SMP 3: Students can construct viable arguments by explaining their reasoning using place value understanding and patterns on the hundreds chart.

SMP 8: Students look for and express regularity in repeated reasoning by by mentally calculating 10 more or 10 less than a given number.</td>
<td>Students who demonstrate understanding can:
• Determine 10 more and 10 less of any two-digit number using physical tool, hundred charts, and number lines.
• Recall 10 more for any two-digit number (e.g., 32 + 10 = 42) without using a tool or representation.
• Recall 10 less for any two-digit number (e.g., 32 - 10 = 22) without using a tool or representation.
• Explain why the tens digit changes and why the ones place does not change when finding ten more or ten less.</td>
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<td>Depth of Knowledge: 1-2</td>
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<td>Bloom’s Taxonomy:
Remember, Understand, Apply and Analyze</td>
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<td rowspan="3">Standard Text

1.NBT.C.6: Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), 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 and explain the reasoning used.</td>
<td rowspan="3">Standard for Mathematical Practices

SMP 3: Students can construct viable arguments by explaining their reasoning using place value understanding and patterns on the hundreds chart.

SMP 7: Students can look for and make use of structure by looking for and describing patterns they find as they work with various representations.</td>
<td>Students who demonstrate understanding can:
• Determine the difference of two multiples of 10 (e.g. 90 - 40) using models, drawings, hundred charts, and number lines.
• Subtract a multiple of 10 from a multiple of 10. (e.g., subtract 90 - 40).
• Explain the difference between two multiples of 10 by relating it to subtracting the tens digit.
• Explain why the ones place does not change when subtracting multiples of 10.</td>
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<td>Depth of Knowledge: 1-2</td>
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<td>Bloom’s Taxonomy:
Understand, Apply and Analyze</td>
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Previous Learning Connections	Current Learning Connections	Future Learning Connections
• Connect to composing and decomposing numbers into tens and ones and students using what they know to solve word problems within 10. **(K.NBT.1, K.OA.2)**	• Connect to relating counting to addition and subtraction. (1.OA.5) • Connect to starting to generalize addition and subtraction strategies to numbers within 100 and focusing on multiples of 10 to encourage the use of place value concepts/strategies. **(1.NBT.2)**	• Connect to fluently adding and subtracting within 100 and solving word problems using strategies based on place value properties of operations, and/or the relationship between addition and subtraction. **(2.NBT.5)**

Clarification Statement:

- 1.NBT.C.5: Students may explain their reasoning by saying that they have **one more** or **one less ten** that before.
- 1.NBT.C.6: **Differences** of **multiples** of 10, such as 70 – 40 can be viewed as 7 **tens minus** 4 tens and represented with **concrete models** such as objects **bundled** in tens or drawings. Children use the relationship between **subtraction** and **addition** when they view 80 – 70 as an **unknown addend addition problem**, 70 + <box> = 80, and reason that 1 ten must be **added** to 70 to make 80, so 80 –70 = 10.

Common Misconceptions

● Students may subtract the digits in the tens place but ignore value of the ones place.

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 uses images/resources when studying use place value understanding and properties of operations to add and subtract because the majority of this cluster will work from the hundreds chart. If students can review this chart and the numbers on it, this will help towards understanding.

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

- K.NBT.A: Work with numbers 11-19 to gain foundations for place value This standard provides a foundation for work with place value because it combines the concept of 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 using place value understanding and properties of operations to add and subtract 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 descriptions (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 the concept can be presented in multiple ways visually, increasing the likelihood of students gaining understanding of the concept (ex. place value blocks, hundreds charts, place value charts, coloring coding place value).

Build

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

- For example, learners engaging with 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 displaying the learning goals in multiple ways because there are various tools available in regards to this standards. Students should have access and the ability to explore these tools to find a method or methods that work best for their individual learning needs. It will also provide students with autonomy for their own learning.

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 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 learners such as allowing for flexibility and easy access to multiple representations of notation where appropriate (e.g., formulas, word problems, graphs) because the concept presented in this cluster can be performed in various mediums using different tools. Students should have access to multiple representations to support generalizing the concept across domains. Here is a link showing various tasks that use different representations to complete the concept of the cluster. http://tasks.illustrativemathematics.org/1-3

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 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 using physical manipulatives (e.g., blocks, 3D models, base-ten blocks) because it makes the concept of adding and subtracting larger numbers more concrete, thereby increasing the understanding.

Internalize

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

- For example, learners 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), such as offering devices, aids, or charts to assist students in learning to collect, chart and display data about the behaviors such as the mathematical practices for the purpose of monitoring and improving because students need access to see how numbers can be made up using various tools demonstrating place value. Once they can see how the quantities are derived, they might have better understanding when combining these qualities or taking away.

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 using place value understanding and properties of operations to add and subtract by critiquing student approaches/solutions to make connections through a short mini-lesson because exploring where they went wrong in their approach to understanding place value for adding and subtracting, but also be reintroduced to tools and strategies that work better for their particular needs.

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 using place value understanding and properties of operations to add and subtract by offering opportunities to understand and explore different strategies because these students might need more individualized support with the different strategies introduced. The various strategies might be helpful to the student; however, they need step by step directions on how to use the strategies and tools to increase familiarity.

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 the opportunity to understand concepts more quickly and explore them in greater depth than other students. When studying using place value understanding and properties of operations to add and subtract because they could consider how adding and subtracting 100 more or less or 1000 more or less would differ from working with 10 more or less.

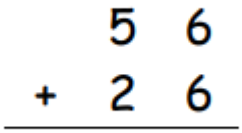
Culturally and Linguistically Responsive Instruction:

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?

Goal Setting: Setting challenging but attainable goals with students can communicate the belief and expectation that all students can engage with interesting and rigorous mathematical content and achieve in mathematics. Unfortunately, the reverse is also true, when students encounter low expectations through their interactions with adults and the media, they may see little reason to persist in mathematics, which can create a vicious cycle of

low expectations and low achievement. For example, when studying use place value understanding and properties of operations to add and subtract goal setting is critical because this is a foundational standard where so many skills are built from. Students need to feel comfortable with the tools and language needed to perform the tasks. There might need to be some added reflection time to encourage students to talk about what is confusing or what they understand.

Standards Aligned Instructionally Embedded Formative Assessment Resources:
Source: https://achievethecore.org/coherence-map/1/4/22/22
Addition within 100
Provided by Learning Heroes, a project of New Venture Fund



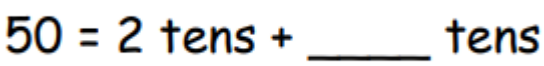
Correct if student writes the number 82.

The best way to find the sum is to take advantage of place value, adding ones to ones and tens to tens.

There are several ways this can be done. Some first graders might use the standard algorithm to organize their work.

This type of assessment question requires students to first combine the tens (50 + 20 = 70), next combine the ones (6 + 6 = 12), and finally add these results to obtain the final answer: 70 + 12 = 82. This approach is fine in grade 1. As problems get more complicated, students will learn increasingly efficient procedures culminating in the standard algorithms.

Place Value Tens
Provided by Learning Heroes, a project of New Venture Fund
Fill in the missing number:



Solution
Correct if student writes the number 3.

50 is 5 tens, and 5 tens can be broken down into parts as 2 tens plus 3 tens. So, the missing number is 3.
This type of assessment question requires students to understand the place value units. This helps students learn how to "borrow" and "carry" in the standard algorithms for adding and subtracting multi-digit numbers. It also prepares students to learn about decimal fractions in later grades. Using tens as a unit can also help with mental math (for example, in problems like 60 + 20 = 80).

Relevance to families and communities:	**Cross-Curricular Connections:**
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	Science: In first grade the NGSS recommend studying light, transparency, and shadows. Consider providing a connection for students to add the lengths of the

connections for students, to work on some problem solving activities together. They can use home language for corresponding vocabulary and numbers.	shadows of two items, where at least one length is in double-digits and the sum is within 100. Social Studies: Social Studies: In first grade the New Mexico Social Studies Standards state students should "Understand the purpose of rules and identify examples of rules and the consequences of breaking them". Consider providing a connection for students to "earn" and "lose" points for following or breaking various rules. Earning can be in groups of 1s, 2s and 5s, and losing can be in groups of 10.