

K.NBT: NUMBER & OPERATIONS IN BASE TEN

Cluster Statement: A: Work with numbers 11-19 to gain foundations for 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.)

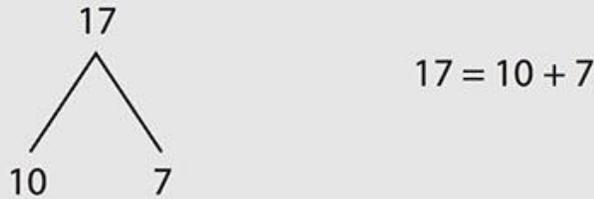
<p>Standard Text</p> <p>K.NBT.A.1: Compose and decompose numbers from 11 to 19 into ten ones and some further ones, e.g., by using objects or drawings, and record each composition or decomposition by a drawing or equation (such as $18 = 10 + 8$); understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.</p>	<p>Standard for Mathematical Practices</p> <p>SMP 2: Students can reason abstractly and quantitatively by symbolically representing a teen quantity modeled concretely or pictorially with numerals and/or vice-versa.</p> <p>SMP 4: Students can model with mathematics by using a variety of groupable objects such as Unifix cubes, bundles of popsicle sticks, and tens frames to compose and decompose teen numbers.</p> <p>SMP 7: Students can look for and make use of structure by shifting from counting every object one at a time to recognizing a group of ten ones and some additional ones.</p>	<p>Students who demonstrate understanding can:</p> <ul style="list-style-type: none"> Describe a representation as ten ones and some additional ones, such as describing a bundle of 10 popsicle sticks and 4 additional popsicle sticks as 10 ones and 4 ones. Connect equivalent representations for the numbers 11 to 19, such as knowing that the number 14 means to count out and bundle 10 popsicle sticks and then to grab 4 additional popsicle sticks and that a pictorial representation of a full tens frame and a second tens frame with four additional dots can be represented symbolically using the numeral "14". Write equations based on concrete and pictorial models that show how a teen number is composed of 10 ones and some additional ones, such as $14 = 10 + 4$.
<p>Previous Learning Connections</p> <ul style="list-style-type: none"> Connect to counting by one to 10 and higher. Connect to counting the number of items in a group of up to 10 objects and knowing that the last number tells how many. 	<p>Current Learning Connections</p> <ul style="list-style-type: none"> Connect to decomposing numbers to ten into pairs in more than one way. (K.OA.3) 	<p>Depth Of Knowledge: 2</p> <p>Bloom's Taxonomy: Apply and Analyze</p> <p>Future Learning Connections</p> <ul style="list-style-type: none"> Connect to thinking of 10 ones as "a ten". (1.NBT.2a) Connect to understanding the numbers 10, 20, 30, 40, 50, 60, 70, 80, and 90 refer to one, two, three, four, five, six, seven, eight, and nine tens and 0 ones. (1.NBT.2c)

Clarification Statement:

K.NBT.A.1: Math drawings are simple drawings that make essential mathematical features and relationships salient while suppressing details that are not relevant of the mathematical ideas.

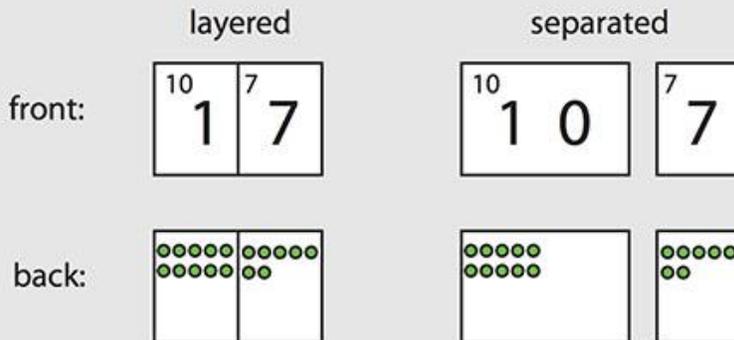
The **numerals** 11, 12, 13, ..., 19 need special attention for children to understand them. The first nine numerals 1, 2, 3, ..., 9, and 0 are essentially arbitrary marks. These same marks are used again to represent larger numbers. Children need to learn the differences in the ways these marks are used. For example, initially, a numeral such as 16 looks like "one, six," not "1 **ten** and 6 **ones**." Layered **place value** cards can help children see the 0 "hiding" under the **ones** place and that the 1 in the **tens** place really is 10 (ten ones).

Number-bond diagram and equation



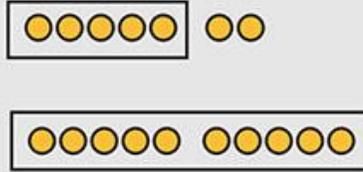
Decompositions of teen numbers can be recorded with diagrams or equations.

Place value cards



Children can use layered place value cards to see the 10 "hiding" inside any teen number. Such decompositions can be connected to numbers represented with objects and math drawings. When any of the number arrangements is turned over, the one card is hidden under the tens card. Children can see this and that they need to move the ones dots above and on the right side of the tens card.

5- and 10-frames



Children can place small objects into 10-frames to show the ten as two rows of five and the extra ones within the next 10-frame, or work with strips that show ten ones in a column.

Common Misconceptions

- Being confused by the names for the teen numbers
- Connecting representations to number names
- Struggling with the concept of unitizing (seeing ten ones as one ten)

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 rehearses new mathematical language when studying work with numbers 11-19 to gain foundations for place value because this targeted instruction will support greater access to grade level instruction and assignments through the integration and early exposure to vocabulary words within the actual mini lesson for the upcoming place value lesson. Illustrations with the oral integration of the vocabulary and modeling will give these students a head start for the actual work with teen numbers and ten-frames.

Pre-teach (intensive)

What critical understandings will prepare students to access the mathematics for this cluster?

K.OA.A.3: This standard provides a foundation for work with work with numbers 11-19 to gain foundations for place value because students need to have the basic foundation of counting numbers and also comparing numbers which one is bigger or smaller. 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:

Interest: How will the learning for students provide multiple options for recruiting student interest?

For example, learners engaging with work with numbers 11-19 to gain foundations for place value benefit when learning experiences include ways to recruit interest such as creating an accepting and supportive classroom climate because students need to feel they can take risks in the classroom without being judged. This feeling is very important because as teachers we want all students to take risks and make mistakes because we can pinpoint where the connection is being broken and we can provide interventions or pre-teach to the students before the actual lesson (setting students up for success).

Build:

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

For example, learners engaging with working with numbers 11-19 to gain foundations for place value benefit when learning experiences attend to students' attention and affect to support sustained effort and concentration such as creating cooperative learning groups with clear goals, roles, and responsibilities because kindergarteners need lots of clear goals and one thing teachers can do is to model. Modeling what to do for students is crucial, and students will have a clear understanding of what they should be doing with counting numbers and understanding the place value of numbers through the use of ten-frames. This should become a daily routine in order for students to really get to understand place value and how addition is putting together.

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 work with numbers 11-19 to gain foundations for place value benefit when learning experiences attend to the linguistic and nonlinguistic representations of mathematics to ensure clarity can comprehensibility for all learners such as pre-teaching vocabulary and symbols, especially in ways that promote connection to the learners' experience and prior knowledge because students in kindergarten need repeated exposure to content vocabulary and the teacher has to be intentional when teacher lessons in regards to this cluster because students need to identify and know, explain what the words mean when learning about place value.

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 work with numbers 11-19 to gain foundations for place value benefit when learning experiences attend to the multiple ways students can express knowledge, ideas, and concepts such as providing scaffolds that can be gradually released with increasing independence and skills (e.g., embedded into digital programs) because students at this age need to be exposed to a lot of modeling of concepts through manipulatives when building numeracy. Teachers can provide the whole group but can begin teaching in small groups in order to begin these activities orally and the teacher will have more control and be able to see and redirect students when working with teen numbers. For example, before students get to work on numbers 11-19, they must have a good foundation of numbers up to 10 and should know that ones can be shown on a ten-frame, but when the ten-frame is full of objects that represent the number 10. Students will be working from the concrete to the abstract and this progression needs to be developed and worked throughout kindergarten. Some students will catch on faster than others and here is where the teacher needs to have an extra eye to see who is ready and who needs more practice on previous building skills. Again, in kindergarten there needs to be lots of modeling and practicing taking place orally and manipulating objects. Having ten-frames available for each child and objects as counters would help with the practice of the teen numbers. This has to become a daily routine not just a one-time lesson.

Internalize

Comprehension: How will the learning for students support transforming accessible information into usable knowledge, knowledge that is accessible for future learning and decision-making?

For example, learners engaging with work with numbers 11-19 to gain foundations for place value benefit when learning experiences attend to students by intentionally building connections to prior understandings and experiences; relating important information to the learning goals; providing a process for meaning making of new learning; and, applying learning to new contexts such as incorporating explicit opportunities for review and practice because students in kindergarten will need lots of practice with working with numbers 11-19 to gain the place value foundation. Students will have to have different ways of composing teen numbers and all this practice will lead students to understand that numbers are related and they can compose and decompose numbers. This is only possible with providing students continuous practice like a

daily review and providing more opportunities for students to work with teen numbers, there are some great place value games for kindergarteners to build fluency with teen numbers (dice and ten-frames) .

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?

Examine assessments for evidence of lingering misconceptions (see common misconceptions). If students exhibit one more of these misconceptions, consider addressing the misconception. For example, students may benefit from re-engaging with content during a unit on work with numbers 11-19 to gain foundations for place value by critiquing student approaches/solutions to make connections through a short mini-lesson because as students are able to give each other feedback this helps them with their critical thinking and examining whether they are correct or make changes to their work.

Re-teach (intensive)

What assessment data will help identify content needing to be revisited for intensive interventions?

Examine assessments for evidence of students still developing the underlying ideas, for example, some students may benefit from intensive extra time during and after a unit work with numbers 11-19 to gain foundations for place value by offering opportunities to understand and explore different strategies because students need to have multiple opportunities to count numbers, know numbers and be able to decompose numbers. Working with numbers at this level means knowing that addition is putting together therefore a number line should be accessible to students but most importantly the use of ten-frames and markers should be used to show composition of numbers.

Extension

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

To extend students learning about working with numbers 11-19, some learners may benefit from an extension such as open ended tasks linking multiple disciplines when studying work with numbers 11-19 to gain foundations for place value because students will benefit from having to relate multiple skills/strategies like counting, adding smaller numbers to get bigger ones, understanding the value of 10 and some ones that come after 10 (11, 12, 13, 14, ...). Having a ten-frame to work with and to show the work is essential specially when the task becomes more abstract as to utilizing symbols for addition.

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 work with numbers 11-19 to gain foundations for place value the use of mathematical

representations within the classroom is critical because five-year old children rely on visuals once a skill has been introduced in a concrete manner. Teacher’s need to plan strategically, foreseeing that vocabulary in kindergarten will be a major issue with all the different experiences students come with. Not all students had the opportunity to attend pre-school, therefore teaching the foundations of place value should be in the progression of difficulty using the model of concrete to abstract representations and the teacher has to provide modeling using objects in order for students to gain understanding and benign to have a foundation with place value.

Standards Aligned Instructionally Embedded Formative Assessment Resources:

Source:

http://s3.amazonaws.com/illustrativemathematics/attachments/000/009/257/original/public_task_1404.pdf?14623

The purpose of this task is to help students understand the base-ten structure of teen numbers. This task was designed specifically to support students in developing fluency with tens and teen numbers.

Relevance to families and communities:

During a unit focused on working with numbers 11-19 to gain foundations for 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 number names and the place value across the languages in the classroom will help students get a better understanding of numbers in general making connections of number names in other languages. For kindergarten, there are lots of games that can be sent home for parents to play with their child and increase the child’s understanding of numeracy and gain the language communication will increase while playing the games. Math nights would be another way of including parent and community involvement in which teachers will model how to play math games in different grade levels. Also, taking advantage of teachers’ second languages to model games in the children’s home language will be very powerful for parents whose second language is developing.

Cross-Curricular Connections:

Social Studies: In Kindergarten, the New Mexico Social Studies Standards state students should “understand the concept of product”. Consider providing a connection for students to see the idea of unitizing in products that are individual items packaged together and sold as a single unit, such as a box of crayons or a box of popsicles.

Morning Meeting (or other morning routine): Consider providing a connection to tracking the number of days in school in a way that makes the number efficient to count, such as full groups of tens frames and an additional partially filled tens frame.