2.OA:OPERATIONS & ALGEBRAIC THINKING

Cluster Statement: Add and subtract within 20.

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.OA.B.2 **Fluently add and subtract within 20 using mental strategies. By end of Grade 2, know from memory all sums of two one-digit numbers.**	SMP 2: Students can reason abstractly and quantitatively by using number relationships and previously mastered facts to solve more difficult facts. SMP 6: Students can attend to precision by accurately solving the problem.	• Efficiently choose mental strategies for addition and subtraction within 20. • Quickly recall all sums of two one-digit numbers. • Fluently add and subtract within 20.
		Depth of Knowledge: 1-2
		Bloom's Taxonomy: Remember
Previous Learning Connections • Connecting to adding and subtracting within 20, demonstrating fluency for addition and subtraction within 10 and using strategies such as counting on; making ten (e.g., 8 + 6 = 8 + 2 + 4 = 10 + 4 = 14); decomposing a number leading to a ten (e.g., 13 - 4 = 13 - 3 - 1 = 10 - 1 = 9); using the relationship between addition and subtraction (e.g., knowing that 8 + 4 = 12, one knows 12 - 8 = 4); and creating equivalent but easier or known sums (e.g., adding 6 + 7 by creating the	**Current Learning Connections** • Connect to strategies to mentally/fluently solve addition/subtraction problems within 20. **(2.OA.2a)** • Connect to knowing from memory one digit plus one-digit math facts. **(2.OA.2b)**	**Future Learning Connections** • Connect to the future work of fluently adding and subtracting within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction. **(3.NBT.2)**

known equivalent 6 + 6 + 1 = 12 + 1 = 13). **(1.OA.6)**		

Clarification Statement:

This standard is strongly connected to all the standards in this domain. It focuses on students being able to fluently add and subtract numbers to 20. Adding and subtracting fluently refers to knowledge of procedures, knowledge of when and how to use them appropriately, and skill in performing them flexibly, accurately, and efficiently. Mental strategies help students make sense of number relationships as they are adding and subtracting within 20. The ability to calculate mentally with efficiency is very important for all students. Mental strategies may include the following:

- Counting on
- Making tens (9 + 7 = 10 + 6)
- Decomposing a number leading to a ten (14 − 6 = 14 − 4 − 2 = 10 − 2 = 8)
- Fact families (8 + 5 = 13 is the same as 13 - 8 = 5)
- Doubles
- Doubles plus one (7 + 8 = 7 + 7 + 1)

Common Misconceptions

- Students may assume they must memorize all the facts rather than working to see the patterns and relationships that will help them flexibility and fluently solve a problem.

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 mental strategies that support fluently adding and subtracting within 20 by introducing new representations (e.g., number lines) because targeted pre teaching ssist students in making new connections to background knowledge while introducing new content.

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

- 1.OA.6: This standard provides a foundation for work with fluently adding and subtracting within 20 by focusing first on adding and subtracting within 10.

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 fluently adding and subtracting within 20 using mental strategies benefit when learning experiences ensure information is accessible to learners with sensory and perceptual disabilities. It is also easier to access and comprehend for many others when teacher displays information in a flexible format to vary perceptual features. Students may require the use of counting strategies such as mental counting with fingers, memorization, repetition, connections, flashcards, and other tools to facilitate perception then internalization. Total physical response may facilitate this process by cuing the students with physical movement, this may include counting songs, dancing, and jumping when adding to create neurological connections.

Build

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

- For example, learners engaging with fluently adding and subtracting within 20 using mental strategies benefit when learning experiences attend to students attention and affect to support sustained effort and concentration such as prompting or requiring learners to explicitly formulate or restate learning goals because by establishing personalized goals for learning addition of two one-digit numbers, students can work and demonstrate learning at their own pacing with scaffolded guided expectations.

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 fluently adding and subtracting within 20 using mental strategies, know from memory all sums of two one-digit numbers benefit when learning experiences attend to the linguistic and nonlinguistic representations of mathematics to ensure clarity and comprehensibility for all learners such as presenting key concepts in one form of symbolic representation (e.g., math equation) with an alternative form (e.g., an illustration, diagram, table, photograph, animation, physical or virtual manipulative) because students can make connections through anchor charts, cognates, and other pictorial and verbal representations.

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 fluently add and subtract within 20 using mental strategies 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 throughout the day. Provide a pictorial support or other tools to assist students in recalling. Use associative memory to connect to previously practiced sums

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 fluently add and subtract within 20 using mental strategies by revisiting student thinking through a short mini-lesson because the teacher can address students' misconceptions, academic and cognitive gaps, and target instruction through a student centered approach in a small group setting.

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 during a unit on fluently add and subtract within 20 using mental strategies by offering opportunities to understand and explore different strategies because offering different strategies as an intensive reteach can support students as they internalize the concept of using addition and subtraction and their relationship.

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 during a unit on fluently add and subtract within 20 using mental strategies could extend their understanding of the relationship between addition and subtraction to consider patterns in adding and subtracting larger 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?

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, during a unit on fluently add and subtract within 20 using mental strategies, goal setting is critical because while this standard covers a long-term goal, students may set independent goals for academic achievement.

Standards Aligned Instructionally Embedded Formative Assessment Resources:
Source: http://tasks.illustrativemathematics.org/content-standards/2/OA/B/2/tasks/1394
This type of assessment question requires students to understand the relationships between numbers, why using a number line or counters helps find the sum or difference and move through different strategies from concrete to abstract. SMP 7 is important to help students look for and make use of structure by using known patterns and facts.
You could use this task to inform and adjust instruction if necessary. This task allows you to assess student's efficiency and flexibility in solving problems using previous understandings. It will also give information on where their understanding is in development of numbers and place value.

Relevance to families and communities:	**Cross-Curricular Connections:**
During a unit focused on using addition and subtraction within 100 to solve one- and two-step word problems, 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 the different mental strategies to add and subtract within 100 to solve one- and two-step word problems, students are more successful when strategies include examples that are culturally relevant and familiar. Students will retain more knowledge when interacting with the concept in a more meaningful way.	Music: Students can practice fluency with addition facts through the use of music.