NEW MEXICO
Public Education Department

6.NS: THE NUMBER SYSTEM

Cluster Statement: B: Compute fluently with multi-digit numbers and find common factors and multiples.

Additional 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:** • Fluently divide multi-digit numbers. **Webb's Depth of Knowledge:** 1-2 **Bloom's Taxonomy:** Apply
6.NS.B.2: Fluently divide multi-digit numbers using the standard algorithm.	SMP 6: Students attend to precision by precisely represent the steps of the division algorithm, attend to precision when calculating the quotient, and correctly labeling the quotient, if needed.	
Standard Text	**Standard for Mathematical Practices**	**Students who demonstrate understanding can:** • Fluently add, subtract, multiply and divide multi-digit decimals. **Webb's Depth of Knowledge:** 1-2 **Bloom's Taxonomy:** Apply
6.NS.B.3: Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.	SMP 6: Students attend to precision by precisely represent the steps of the appropriate algorithm, attend to precision when calculating the quotient, and correctly labeling the quotient, if needed.	
Standard Text	**Standard for Mathematical Practices**	**Students who demonstrate understanding can:** • Find the GCF of two whole numbers less than or equal to 100. • Find the LCM of two whole numbers less than or equal to 12. • Use the distributive property to express a sum of two whole numbers (1-100) with a common factor as a multiple of a sum of two whole numbers with no common factor . **Webb's Depth of Knowledge:** 1-2 **Bloom's Taxonomy:** Understand, Apply
6.NS.B.4: Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1-100 with a common factor as a multiple of a sum of two whole numbers with no common factor. *For example, express 36 + 8 as 4 (9 + 2).*	SMP 6: Students can attend to precision by communicating precisely with others and use clear mathematical language when discussing the algorithms SMP 7: Students can look for and make use of structure by using tree diagrams and Venn Diagrams to show LCM and GCF.	

Previous Learning Connections	**Current Learning Connections**	**Future Learning Connections**
• Students will need to reflect on their previous understanding of factor pairs from 4th grade. They will connect their previous learning around multiples to finding LCMs and GCFs in this cluster. • This cluster also connects to instruction from Grade 5 where students found whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value. These same skills will be utilized when dividing decimals.	• In this cluster students use the distributive property to express a sum of whole numbers. This connects to future 6th grade learning when they explore the conceptual understanding of the distributive property in the 6.EE.A cluster.	• Students will connect their skills with the standard algorithm in order to successfully multiply and divide rational numbers. This will be connected in the standard algorithm as well as in application to real-world contexts. In high school, learners continue to use the distributive property to express a sum of two whole numbers with a common factor as a multiple of a sum of two whole numbers with no common factor as they learn factorization.

Clarification Statement:
Students will continue to build on their previous understanding of adding, subtracting, multiplying, and dividing to fluently use algorithms to solve problems. They will also work with finding the GCF to begin the early stages of factoring.

Common Misconceptions

- Students may misplace the decimal point when representing the product or quotient of decimals.
- Students may confuse the concepts of factors and multiples.
- Student may have difficulty in finding LCM and GCFs. They may misunderstand when to apply LCM and when to apply GCF to 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 that rehearses prior learning when studying computing fluently with multi-digit numbers and finding common factors and multiples because students were asked in 5th grade to perform operations with multi-digit whole numbers and decimals to hundredths and in 4th grade to gain familiarity with factors and multiples. The basic work of both grades will be vital to developing fluency.

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

- 4.OA.B.4: This standard provides a foundation for work with computing fluently with multi-digit numbers and finding common factors and multiples because students are asked to determine factors and if a number is composite or prime. This will help them in their grade level work of expressing factors in different ways using

distributive property. 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 computing fluency with multi-digit numbers and finding common factors and multiples benefit when learning experiences include ways to recruit interest such as providing novel and relevant problems to make sense of complex ideas in creative ways because students are often not interested in activities that have no relevance to their lives especially in abstract math concepts and math skills so for this standard one might provide relevancy by using the students' culture in the math problems. For example, Pueblo students could create multiple problems around Feast Day.

Build

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

- For example, learners engaging with computing fluently with multi-digit numbers and finding common factors and multiples benefit when learning experiences attend to students attention and affect to support sustained effort and concentration such as generating relevant examples with students that connect to their cultural background and interests because students will stay engaged if the context of the activities, examples, tasks, problems, etc. are culturally relevant to them such as real world statistics about Type 2 diabetes which could connect in a cross-curricular unit to history/social studies, science, health/PE, and language arts.

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 computing fluently with multi-digit numbers and finding common factors and multiples benefit when learning experiences attend to the linguistic and nonlinguistic representations of mathematics to ensure clarity and comprehensibility for all learners such as linking key vocabulary words to definitions and pronunciations in both dominant and heritage languages because in creating culturally relevant curriculum should include the use of the students' heritage language which will help build their understanding of the concepts and skills and help with their engagement with the curriculum. For example, for Spanish learners when pre teaching key vocabulary you would connect Spanish to English words like "compute" and "calcular" and possibly use both in context.

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 computing fluently with multiplication and division and finding common factors and multiples benefit when learning experiences attend to the multiple ways students can express knowledge, ideas, and concepts such as providing sentence starters or sentence strips because sentence

starters allow for greater participation and equity in participation as well as deeper discussions. For example, provide a graphic organizer for sequencing their steps, provide a word bank with words like first, second, third; provide guiding questions like, what are the major steps in this sequence.

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 computing fluently with multi-digit numbers and finding common factors and multiples 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 using activities that include a means by which learners get feedback and have access to alternative scaffolds (e.g., charts, templates, feedback displays) that support understanding progress in a manner that is understandable and timely because progressing towards independence is highly motivating to students and develops the propensity towards building lifelong learners .

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 computing fluently with multi-digit numbers and finding common factors and multiples by clarifying mathematical ideas and/or concepts through a short mini-lesson because students may confuse operations with decimals and need a reminder of how to work within the algorithm and/or look at different models for factors to determine if they could both be correct.

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 computing fluently with multi-digit numbers and finding common factors and multiples by addressing conceptual understanding because it is important for students to understand why an algorithm works if they are going to use it with fluency. This helps students to catch mistakes and understand if a solution is reasonable or not.

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 computing fluently with multi-digit numbers and finding common factors and multiples because problem solving and modeling using a variety of interesting topics can be used to give students experience in applying the skills they are now fluent with.

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?

Building Procedural Fluency from Conceptual Understanding: Instruction should build from conceptual understanding to allow students opportunities to make meaning of mathematics before focusing on procedures. When new learning begins with procedures it privileges those with strong prior familiarity with school mathematics procedures for solving problems and does not allow learning to build for more methods for solving tasks that occur outside of school mathematics. For example, when studying computing fluently with multi-digit numbers and finding common factors and multiples the types of mathematical tasks are critical because all students need a well-developed conceptual understanding of operations with decimals, factors and multiples. It is important to make sure that opportunities are given to develop this understanding so that some students are not at a disadvantage when using the algorithm and developing fluency.

Standards Aligned Instructionally Embedded Formative Assessment Resources:
Source: Illustrative Mathematics http://tasks.illustrativemathematics.org/content-standards/6/NS/B/3/tasks/274

6.NS.B.3 Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.

- Learning Target: I can identify and use the appropriate algorithm to solve a real-world problem.
- This type of assessment question requires students to know how to apply the division algorithm and to correctly use the algorithm with decimals. This task will provide a teacher with insight into how a student identifies the appropriate algorithm needed to solve the task, how to set up the algorithm correctly, and then how to use the algorithm correctly to solve the task.

Relevance to families and communities:

During a unit focused on computing fluently with multi-digit numbers and finding common factors and multiples, 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 ways decimals, factors or multiples are used in the home and community can a be a great way to connect schools tasks with home tasks.

Cross-Curricular Connections:

English:

- RST.6.8.3- following precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
- RST.6.8.4- demonstrating the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grade 6-8 texts and topics.
- RST.6.8.7- distinguish among facts, reasoned judgment based on research findings, and speculations in a text.
- SL.6.1- engage effectively in a range of collaborative discussions (one-on-one, in groups and teacher-led) with diverse partners on grade 6 topics, texts, and issues building on other's ideas and expressing their own clearly.

Social Studies:
CCSS.ELA-LITERACY.RH.6-8.1/CCSS.ELA-LITERACY.RH.6-8.7-Students can determine growth in different contexts

	related to social studies. Students can apply their knowledge of number operations to create a claim for a question.