General Questions:

Grade Specific Questions:

Grade K:

Grade 1:

Grade 2:

Grade 3:

Grade 4:

Grade 5:

Why does Eureka Math use "Fraction greater than 1" instead of Improper fraction?
Unfortunately, the term improper fraction carries some baggage. As many have observed, there is nothing improper about an improper fraction. Nevertheless, as a mathematical term, it is useful for describing a particular form in which a fraction may be presented (i.e., a fraction is improper if the numerator is greater than or equal to the denominator). Students need practice in converting between the various forms a fraction may take. Try not to foster the misconception that every improper fraction must be converted to a mixed number. (Grade 4 Module 5 Topic E Overview)

Students will eventually hear or see the term "improper fraction," but the hope is that they can make sense that an improper fraction isn't incorrect or "improper"; it is simply the name for a certain type of fraction.

Why are some standards bolded and some are not in the Module Overview?
The bold standards are the standards the students should know to be successful in the current module. Eureka Math TEKS refers to the bolded standards as Focus Standards. Standards not bolded are related to the Focus Standards but are not directly taught within the Topic. These standards are supported by the work in the lessons but are not a focus of the lessons.

For example, in Grade 1, where you will see word problem standards bolded and basic facts standards in normal font, this indicates word problems/problem solving are the focus, and that when students solve an "addend unknown" or other types of word problems, their knowledge of basic facts are strengthened.

Finally, standards are embedded in the Topic, not Lesson. The lessons in a Topic, taken as a whole, focus on the bolded standards; the related standards are identified as a consequence of the focus standards.

Do the assessment components include the new STAAR item types?
The assessments that are a part of the curriculum are open-ended and graded by leveraging a rubric. If you have Affirm TEKS Edition, you can use the Topic quizzes, and Mid- and End-of-module assessments digitally for more specific reporting data. The digital assessments have question types similar to the updated STAAR (e.g., drag and drop, fill in the blank, etc.). Affirm also provides quicker grading and reporting for teachers, while going beyond the multiple-choice questions.

Is the scope and sequence of Eureka Math aligned to the TEKS Resource System (TRS) Year-at-a-Glance (YAG)?

Eureka Math TEKS Edition follows its own scope and sequence. We refer to it as a Story of Units; each module is carefully sequenced to ensure coherence and rigor throughout the year and over the year. It is not recommended to move modules are lessons around. This will cause a disconnect in learning.

Why are there 2 days for each assessment?
The idea is that instead of reviewing before you give the assessment, you give the assessment and use that data to inform what you need to review or reteach. That review becomes the second day allocated for the assessment. It helps ensure that you are spending the extra time on what the students need to succeed as they continue to move forward. On the second day, the assessments are returned, and remediation can occur for any common misconceptions the teacher may have seen while grading the assessment.

Those two days are "non-instructional days" that teachers can use whenever they want. So, they might give an assessment for a full class period, grade it, use half a class period to "return" it, and then take another half class to remediate. These days do not have to be back-to-back.

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Is Eureka Math aligned to the TEKS?

Eureka Math is fully aligned to the TEKS and encompasses all mathematical process standards. Each lesson was vetted and approved by TEA to ensure the coverage of every TEKS. Eureka Math maximizes coherence across grade levels, which is the most effective approach to helping students master mathematical concepts. The consistent use of the same models and problem-solving strategies leads to a deeper understanding of new concepts. Eureka Math teaches conceptually using the concrete, representational, to abstract approach. Students consistently make connections as they move from simple to more complex math. Rigor is evidenced through critical thinking, application of concepts, long-term retention, and student ownership. Each lesson arranges for students to interact with the teacher, the content, and one another in a variety of ways, including interactive fluency activities, collaborative problem-solving, and daily reflection and debrief.

Eureka Math is not a spiraling curriculum in the traditional sense. Rather, it might be helpful to consider it a layering curriculum. A grade level's various modules are strategically and intentionally ordered to work as foundations for each other. This means that Module 1 does not end at the last module lesson or when you administer the end-of-module assessment. Opportunities for students to revisit the concepts of Module 1 will show up throughout the school year. Grade 4 Module 1 is a good example of this. Fourth-grade teachers may be concerned when they finish teaching Module 1. They may be worried that students just hadn't mastered the concepts from this module. Then, in Module 3, teachers realize that their students have learned more as each lesson unfolded. They realize that they are revisiting these standards at a deeper level. Module 3 offers an opportunity for students to apply their understanding.

Beyond integrating academic and social-emotional skills at individual grade levels, the curriculum is vertically aligned to foster social-emotional development over time. As the curriculum's mathematics becomes more complex, so does the complexity of social-emotional expectations across the K–5 grade span. Initially, young students may be asked to respond chorally or turn and talk with a partner. As students progress, their choral responses become written responses in whiteboard exchanges, and their turn-and-talk interactions become small group discussions or whole class discourse. Over time, students view themselves as authors of ideas whose contributions are valuable in constructing shared mathematical understanding in the classroom. Research has demonstrated the powerful and lasting effects of integrating academic, social, and emotional learning.

Why doesn't Eureka Math include every model on the STAAR assessment? What should teachers do if a particular model is used on STAAR but is not in Eureka Math TEKS?

Eureka Math TEKS leverages all models listed in the standards. Specific models used on STAAR vary year-to-year, and some models are used once and never used again.

For example, Grade 5 STAAR has used different fraction models each year. Instruction should not teach one specific model, rather, instruction should focus on the underlying concepts of part-whole relationships that apply to all fraction models. (What is whole? How many parts are there? How many parts are selected?) This way, students can apply their understanding to any model they may see on STAAR.

Why does Eureka Math use the term "Bundle" as well as Place Value Disks instead of Base 10 blocks?

Bundles and base ten blocks are proportional units used to help establish place value understanding. These proportional models are used at the beginning of Grade 2, to establish a deep understanding of the concept that the size of each unit on the place value chart grows ten times as much as the unit to its right. However, because the proportional models are cumbersome and are not easily used with either large numbers (with 4 or more digits) or with small numbers (decimals), we transition students quickly to non-proportional models. We start with money and then transition to place value disks. It is important for students to become proficient with modeling math problems using place value disks in Grade 2, to build a foundation for their work in later grades. Students will continue using place value disks through Grade 5 when modeling algorithms, and as a support for mental math with very large whole numbers. Whole number place value relationships modeled with the disks are easily generalized to decimal numbers and operations with decimals. The manipulatives and models used in Eureka have been carefully thought through. Starting in K, students are introduced to 5-groups, which is a linear representation of dots to allow students to count to five and find number partners within 5, gaining fluency with these numbers. In Kindergarten, a second row of 5 dots are added to represent numbers within 10. In Grade 1, these 10 dots are drawn as a row, and once students are introduced to the place value units, ones and tens, students more quickly represent the 10 dots as a stick to show 1 ten. Eureka Math uses the term bundle (as well as group, regroup, rename, compose and decompose) to describe making a higher value unit (10 ones as 1 ten) or unbundle, making a smaller value unit (1 ten as 10 ones). This action of bundling is applicable across the entire place value system, whole numbers and decimal numbers. Eureka uses 5-groups and bundles to conceptually show this action, both concretely and pictorially. Base ten blocks break down because there are no base-ten blocks to represent decimals, and base-ten kits usually come with limited amounts of hundreds flats and thousands cubes. 5-groups are used in Kindergarten through Grade 5 to build the conceptual understanding of bundling for any unit in the place value system.

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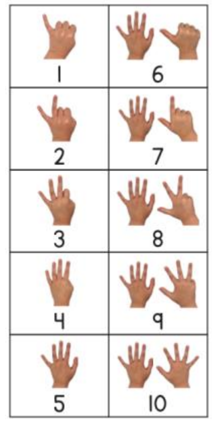
What is counting the math way? How does it affect later learning?

Fingers are familiar manipulatives that students have with them all day, every day, and if used intentionally, fingers can support conceptual understanding and problem solving throughout elementary school. Around the world, people use their fingers to represent numbers in many different ways. Depending on their cultural experiences, young children may begin counting on a thumb, pointer finger, pinkie, or even a section of a finger. Students learn to count the math way in module 1, starting with 1 on the left pinkie finger and continuing to 10 on the right pinkie finger.

The mathematical advantage of counting the math way is that students count from left to right without interruption, just as they do on the number path, and eventually, the number line. Students see and feel the quantity increase as they count forward. The steady increase in distance from the starting point is a physical and visual model for understanding the magnitude of a number.



Counting the math way has advantages for understanding number relationships that will be important in kindergarten and beyond.

- ***Unitizing.*** *When students unitize, they make use of five as a whole instead of thinking of it as 5 individual pieces. The structure of our hands makes it easier for students to unitize 5 when they think about 6 as 5 and 1, 7 as 5 and 2, and so on. Unitizing is a key step to using Level 2 counting on strategies.*
- ***Partners to 10.*** *Fluency with partners to 10 is critical to Level 3 problem-solving strategies. When counting the math way, students can easily see that the raised fingers and the lowered fingers are partners to 10. Other ways of finger counting do not always keep the fingers representing each part next to one another.*
- ***Embedded numbers.*** *The ability to decompose a number into embedded parts is foundational to many Level 3 strategies. Showing parts within a total is easy when both parts are 5 or less. When modeling 2 + 3, a student can show one part on each hand. It is more challenging to see the parts when modeling 6 + 2. As fine motor skills develop, students can wiggle the fingers representing one part while holding the other part steady. Counting the math way creates consistency with how the embedded number looks inside the total.*

Why teach students the number bond model?

Number bonds are one of the most effective tools for modeling and recording composition and decomposition. They show the relationships between numbers, which is a key element of number sense. Number bonds serve at least three purposes:

1. ***Number bonds provide a visual structure that helps students learn basic facts more easily.*** *In kindergarten, students first use number bonds to model the relationship between parts and total. Later they relate the relationships the model shows to addition and subtraction situations. Students in grade 1 explore the inverse relationship between addition and subtraction. They see that the same number bond can represent both addition and subtraction facts. Fluency with basic facts prepares them to solve problems by using mental math or algorithms with fewer errors in years to come.*

2. ***Number bonds help students think flexibly about numbers by providing a reliable visual structure.*** *Students who are comfortable representing decomposition with number bonds can break down challenging problems and make them easier to solve. This type of thinking, known as making an easier problem or a Level 3 strategy, generally begins in grade 1 with whole numbers and extends through elementary school as students learn about fractions.*

3. ***Number bonds prepare students to do quick calculations in their head.*** *The early decomposition and composition work that students do with the number bond increases their ability to do mental math. Decomposition can make any problem easier to solve, regardless of operations involved in solving.*

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Does the orientation of the number bond matter? Why?

The part–whole relationship between the numbers remains the same no matter how the number bond is oriented. Students can write a number bond with the total above, below, or to either side of the parts so long as the arms correctly connect the parts to the total.

However, thoughtful orientation can help students make sense of a situation or story problem. Students usually find it easier to think about known quantities first. The dot card, for example, shows a total of 7. Use the directionality rules for reading and writing English to put the known quantity first: write 7 at the top or to the left. Students decompose the total in different ways by recording parts on the bottom or to the right.

Orient the number bond to represent the way students think about (or are likely to think about) a situation. For example, if there are 3 thin markers and 4 thick markers and the total is unknown, students tend to first create groups of 3 and 4 (the parts). Then they put the groups together to compose 7 (the total). Write the known parts to the left or at the top. Show the total at the bottom or to the right. When students write their own number bonds, the orientation may vary.

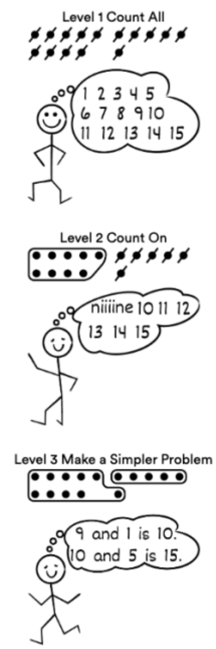
What are the levels of development as students learn to solve addition and subtraction problems?

In their first years of school, students generally move through three levels of development as they solve addition and subtraction problems.

- *Level 1: Count all*
- *Level 2: Count on*
- *Level 3: Make a simpler addition or subtraction problem*

Many students rely on direct modeling to count all throughout the kindergarten year. To add, they represent the parts by using objects or drawings and then count all to find the total. To subtract, they first count out the total, then count to take away the known part, and finally count the remaining part.

Kindergarten students often spend the full year at Level 1 because they are developing conceptual understanding of what it means to add and subtract. They are learning many different ways to represent those actions, including using concrete objects, drawings, mental images, and number sentences. They are also learning which situations call for each operation. As students build conceptual understanding of addition and subtraction through counting all, they increasingly see that parts are embedded in the total. This is foundational for counting on to add or subtract.



Some students begin to use counting on to solve addition problems in kindergarten. Module 5 includes teacher notes and lessons to support these students. The lessons include examples of student strategies from Levels 1 and 2, including questions to advance student thinking from one level to the next. Comparing and connecting different student work can help them make sense of more sophisticated strategies and relate them to their own thinking.

Students spend much of their first and second grade years in the third developmental level, using what they know to make simpler problems. Once they acquire several strategies, students reason about which strategy best fits the problem they are solving. The goal is to empower them to continue developing number sense and flexibility in problem solving.

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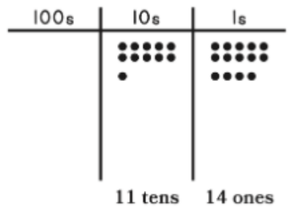
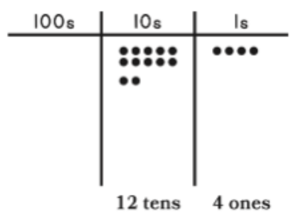
Why does Eureka Math place so much emphasis on unit form? How does the study of unit form affect later learning?
From their early mathematical experiences through grade 5, students learn that units can be counted: 3 apples, 3 ones, 3 centimeters, 3 hundreds, 3 fives, 3 sixths, and so on.



Throughout Eureka Math, students use unit form to think flexibly about numbers and the meaning of place value units. For example, 124 can be represented in unit form as 1 hundred 2 tens 4 ones, 11 tens 14 ones, or 12 tens 4 ones. Unit form helps determine the value of a digit. When students work with numbers in unit form, they must attend to how many of each place value unit are represented, especially when they work with more than 9 of a given unit.



Expressing numbers in unit form has advantages for operating on numbers in grade 2 and beyond.

- ***Adding like units.*** *Students may use unit form to add like units. For example, when students add 58 and 65, they may add 5 tens and 6 tens to make 11 tens, or 110; then add 8 ones and 5 ones to make 13 ones, or 13; and then add the two parts: 110 + 13 = 123.*

- ***Renaming a total.*** *Students may use unit form when they rename a total to subtract. For example, when students subtract 58 from 96, they may decompose a ten and rename 9 tens 6 ones as 8 tens 16 ones.*

Unit form plays a foundational role in work with number relationships, operations, and place value understanding and is therefore a critical element of grade 2.

Why don't students underline key words when solving one- and two- step word problems?
When students underline key words, they often use them to focus solely on the numbers and operate on them regardless of meaning and the part–total relationships within a given problem. A common misconception among students is that more always means to use addition, and that fewer always means to use subtraction. Therefore, instead of searching for key words, students are empowered to approach word problems by using the Read–Draw–Write process. Through this process, students read and represent what they know, one segment at a time. Then as problems become more complex in later grades, students have reliable models and processes to lean upon confidently.

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Grade Specific Questions

Grade K:

Why are Kindergarten students composing and decomposing numbers?

TEKS count numbers to at least 20 and requires the same skills as numbers to 10: rote counting, cardinal counting, rational counting, subitizing, reading, writing, representing (both with things and numerals - recognizing a written numeral and producing a set, counting a set and writing the numeral that matches it); generating 1 more/less, comparing sets with comparative language both with sets and numerals. So.....composing/decomposing - seeing smaller sets within the larger teen number and solidifying 10 as a benchmark for this range of numbers is crucial....The ability to "see" that group of 10 ones allows students to leverage the relationships that they already understand with single digit numbers to the teen numbers which makes counting sets, writing numerals and comparing MUCH easier!
Now, having said all that, it is perfectly correct that the writing of addition sentences (M5 L20) and naming missing parts especially with all the notation (M5 L21) is a reach beyond TEKS for Grade K. Those are ideas that they could lightly introduce or skip. However, the reasoning used in L22 around finding the 10 benchmark and then only looking at the "some ones" parts to compare is an efficiency that connects single digit understanding with double digit understanding. L23 is a return to simply representing teen numbers in any way...they could soft-soap the notational aspects if they'd like, but still allow the students who picked up on the notation (if they chose to include it in a consolidated lesson) to use it as a way to show a teen number. If nobody uses an addition sentence on the problem set for L23, it doesn't matter. Then L24 is a great time to see how students are thinking about teen numbers in the culminating task. Future considerations: Composing and decomposing these teen numbers as a group of 10 ones and some more ones is also vital for the place value understanding that they must develop in G1. Further, finding that a group of 10 ones is an important bridge for unitizing a ten. It is important to stick with the language in the curriculum.

Why isn't there a lesson for each number from 1 to 10?

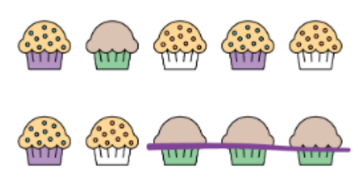
Module 1 focuses on strategies rather than specific numbers. When students learn strategies for counting accurately, they are able to apply them to different numbers arranged in different configurations. For instance, when counting in a circular configuration, the challenging part is identifying the starting and stopping points so that every object is counted once and only once. Once a student has learned a strategy for marking the start, that strategy can be useful in successfully counting any number of objects in a circular configuration. The same strategy for marking the start can also be used to count the sides and corners of shapes. As early as possible, we want students to approach problem solving with a strategy that allows them to be accurate and efficient. When a lesson focuses on a single number, students go into the counting task anticipating the total. Counting tasks in which students do not already know the total but genuinely want to know the total open them to the process of choosing a strategy to solve a problem. With good questioning, students can begin to evaluate whether their chosen strategy is effective. A focus on strategies rather than specific numbers means that the size of a set can be varied to challenge individual students. This approach creates accessibility and engagement for kindergartners with a range of counting experiences.

Why is it important for students to interpret number sentences in different ways?

In Kindergarten, students describe the relationships between numbers by using everyday language: and, make, take away, *and* is. *Everyday language precedes academic language because experiences of making things and taking away are relatable to young students. Statements such as* 10 take away 3 is 7 *align neatly with the numbers and symbols in an equation, creating a smooth transition to the mathematical terminology of* plus, minus, *and* equals*:* 10 minus 3 equals 7. *In module 5 reading number sentences using everyday and mathematical terminology helps students make sense of how numbers and symbols work together in a number sentence.*

Another way that students read number sentences is called reading like a storyteller: The baker made 10 muffins. He sold 3 of them. There are 7 muffins left. *By using story language after solving, students move from computation back to context. Rather than saying, "the answer is 7," they can more specifically say, "there are 7 muffins left." Recontextualizing the entire number sentence as a story shows that students understand the meaning of each quantity, as well as how the actions or relationships correlate to the symbols.*

Saying the number sentence by using mathematical and story language prepares students for the Read–Draw–Write (RDW) process. Beginning in grade 1, students write both a number sentence and a statement in the last step of the RDW process.



$10 - 3 = 7$

Everyday language: 10 take away 3 is 7.
Mathematical language: 10 minus 3 equals 7.
Story language: The baker made 10 muffins. He sold 3 of them. There are 7 muffins left.

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Which word problem types, or addition and subtraction situations, must be mastered in Kindergarten?

Students solve all four of the kindergarten problem subtypes in Eureka Math:

- ***Add to with result unknown**: Both parts are given. An action joins the parts to form the total.*

  Auntie had 3 apples at home. Then she went to the store and bought 5 apples. How many apples does she have now?

- ***Take from with result unknown**: The total and one part are given. An action takes away one part from the total.*

  I bought 9 oranges. I ate 5 oranges. How many oranges do I have now?
- ***Put together with total unknown**: Both parts are given. No action joins or separates the parts. Instead, the parts are distinguished by an attribute such as type, color, size, or location.*

  There are 6 baby ducks and 1 adult duck. How many ducks are there?
- ***Take apart with both addends unknown**: Only the total is given. Students take apart the total to find both parts. This situation is the most open ended because the parts can be any combination of numbers that make the total.*

  There are 8 meerkats moving to a new zoo. Two trucks drive them to their new home. How could the zookeeper put the meerkats in the trucks?

How does the way we name teen numbers impact the way students understand them?

Kindergarten students need to master a critical idea about teen numbers, or numbers 11 to 19. Each teen number is composed of 10 ones and some more ones. The way we name teen numbers in English does not make this clear and can cause confusion for the following reasons.

- ***Absence of ten in the number names**: Numbers 13 through 19 include teen, which indicates, but does not say, ten. Eleven and twelve do not include teen, as their origins are Old English words meaning "one left" (after ten) and "two left."[1] Because the word ten is obscured or left out of teen number names, most students do not initially understand that the digit 1 in a teen number represents 10 ones. They see 14 as 1 and 4 instead of 10 and 4.*
- ***Inconsistent naming structure**: The words eleven, twelve, thirteen, and fifteen do not contain the name of the digit in the ones place (i.e., one, two, three, five). Fourteen, sixteen, seventeen, eighteen, and nineteen do contain the name of the digit in the ones place. Inconsistency makes it more difficult for students to discern how many ones there are beyond 10.*
- ***Order of pronunciation**: In numbers 13 through 19, we say the digit in the ones place first. This can lead students to reverse digits when writing numerals. Fourteen is often written as 41 instead of 14.*

Clarifying the idea that each teen number is composed of 10 ones and some more ones began with Say Ten counting in module 5. This way of counting establishes 10 as a benchmark and highlights the base-ten structure within teen numbers. When students relate Say Ten counting to regular counting (e.g., ten 1 is the same as eleven), students understand that 11 represents 10 ones and 1 one and 12 represents 10 ones and 2 ones, and so on.

Module 6 provides repeated experience decomposing teen numbers by using tools that highlight the base-ten structure of our number system, including fingers, 10 frames, and rekenreks. Hide Zero cards are used alongside these concrete representations to help students see that the digit 1 in a teen number represents 10 ones.

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Grade 1:

Is there a reason why the RDW process in not explained in Grade K and 1 Module 1 overview?

In Grade 1, starting in lesson 1, the RDW process is referenced for students to use, but it's not explained. It is written in Module 1 for Grades 2-5. Even though we talk about Read Draw Write in the early grades, it is a very informal process. Read- is most often done by the teacher (probably more of a "talk through"), Draw- sometimes takes the form of doing something concretely and Write- is definitely different for every child based on their developmental stage. It is so that teachers of young children would not try to carry out RDW in a literal sense.

What are the 3 counting levels?

Students in K–2 advance through three strategy levels as they count, add, and subtract. All levels are valid strategies. However, each next level offers greater efficiency for problem solving.

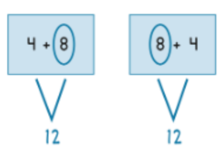
- ***Level 1, Direct Modeling by Counting All or Taking Away:*** *Students represent problems with groups of objects, fingers, or drawings. They model the action by composing or decomposing groups and then they count the result.*
- ***Level 2, Counting On:*** *Students count to solve, but they shorten the process of counting by starting with the number word of one part. They use different methods, such as fingers, to keep track of the count.*
- ***Level 3, Convert to an Easier Equivalent Problem:*** *Students work flexibly with numbers. They decompose and compose parts to create equivalent, easier problems.*

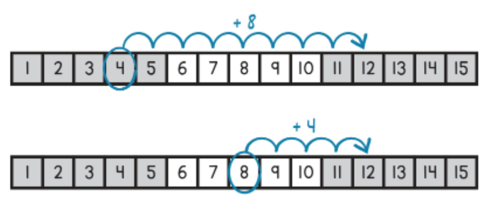
What stages do students move through as they develop skills with counting on?

Counting on is foundational to more efficient addition strategies, mastery of facts within 20, and finding an unknown part. It takes practice for students to trust that counting all and counting on strategies each produce the same total. Several complexities are involved:

- When presented with two parts composed of discrete objects, students intuitively count the objects to find the total. Rather than count all the objects starting at 1, they subitize one part and say how many (the quantity). Then they point to each object in the second part to count on. They understand that the last number stated is the total. They recognize that counting on is addition, recording the parts and total in number bonds and number sentences.

- When given one set of discrete objects, students will subitize an embedded part and count on to find the total. Students may point to the remaining objects as they count on, or they may begin to use their fingers to keep track. Students begin to realize that they can count on from either part and get the same result.
- When presented with an addition expression, students state the first addend (possibly by making a fist). Then they count on the second addend, tracking with fingers. They stop when the number of fingers is the same as the second addend. The last number said is the unknown total.
- Students first experience using one hand to count on, when the addend is 5 or less, and using two hands to count on when the addend is 6 through 9.
- Students will see that the sums are the same, or equal, when counting on from either addend. They use number paths to show that counting on from the larger addend is more efficient. Finally, they choose to count on from the larger addend by thinking of 8 + 4 when presented with 4 + 8.





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Which new word problem types, or addition and subtraction situations, are used in this module?

Students work with all the problem types in Grade 1. Listed below are the problem types students are introduced to for the first time in grade 1.

- ***Add to with start unknown:*** *The part that represents the add to action and the total are given. The unknown is the starting part.*
  Kit has some dollars. She gets 7 more dollars for helping her mom. Now she has 15 dollars. How many dollars did Kit have to start?

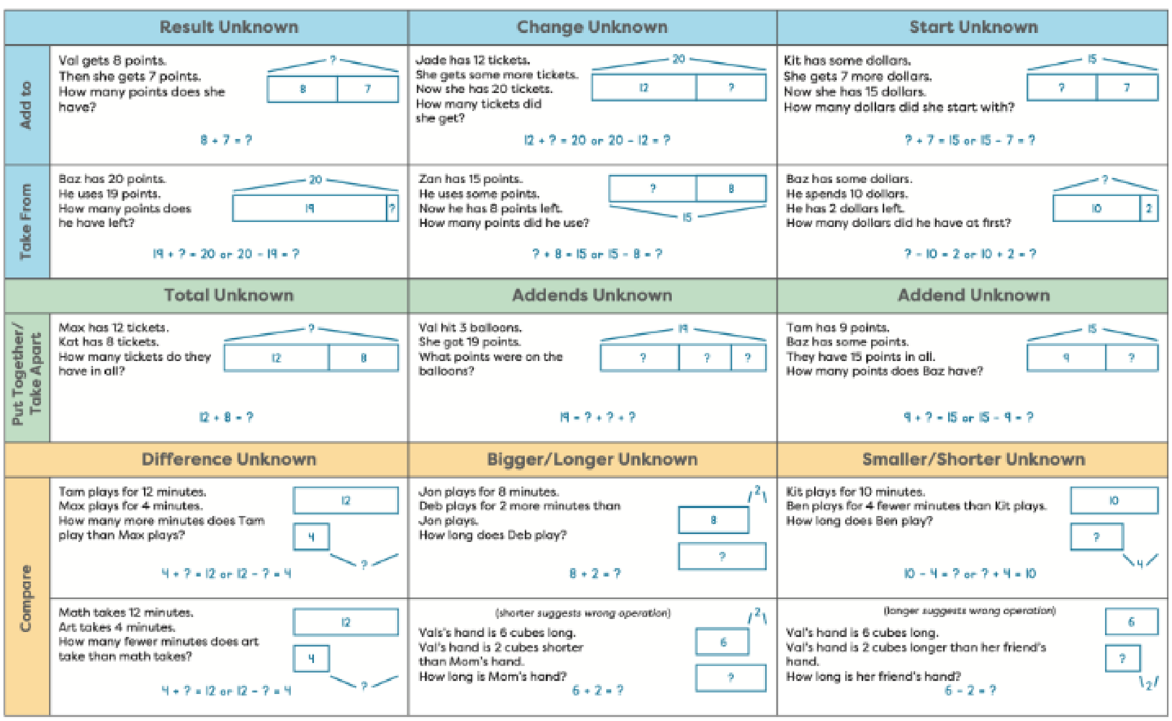
- ***Take from with start unknown:*** *The part that represents the take from action and the part remaining are given. The unknown is the total at the start.*
  Baz has some dollars. He spends 10 dollars. He still has 2 dollars left. How many dollars did Baz have to start?

- ***Compare with longer length unknown (shorter suggests wrong operation):*** *The shorter length and the difference are known, but the longer length is unknown. The word shorter incorrectly suggests subtracting the difference from the smaller length.*
  Imani's shoe is 11 paper clips long. Imani's shoe is 6 paper clips shorter than Kioko's shoe. How many paper clips long is Kioko's shoe?

- ***Compare with shorter length unknown (longer suggests wrong operation):*** *The longer length and the difference are known, but the shorter length is unknown. The word longer incorrectly suggests adding the difference to the longer quantity.*

  Kioko's book is 13 paper clips long. Kioko's book is 4 paper clips longer than Imani's book. How many paper clips long is Imani's book?

How are the problem types in Grade 1 represented by using strip diagrams?



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Grade 2:

Are pictographs covered in Grade 2?

Pictographs are an unnecessary detour for students mathematically (especially second graders). If they can interpret a graph that uses any "object" it doesn't really matter what that object is - a circle, a rabbit, a car....cognitively one is not more complex than another when it comes to reading a graph. Outside of the circles for pictographs, there are no other examples. When working on those lessons, if teachers choose to, they can pull in graphs with pictures so that students can make connections. The cognitive load in reading a graph is the same, regardless of the object.

Why does second grade use both unlabeled charts and labeled place value charts?

An unlabeled chart is used with bundles, money, and place value disks. For each of these models, the value of the unit is clearly labeled or is evident by size. Placing a tens disk in a column labeled tens may cause confusion and be misinterpreted as 10 tens.

A place value chart labeled with hundreds, tens, and ones is used when students begin to make place value drawings. Without a labeled place value chart, the unlabeled drawings could represent any number. The labeled place value chart indicates the value of each column, giving meaning to the place value drawing.

Why are there so many simplifying strategies for addition and subtraction?

By the end of grade 2, students are expected to add and subtract fluently within 100 by using strategies based on place value, properties of operations, and the relationship between addition and subtraction. Fluency means being able to operate with numbers flexibly, efficiently, and accurately.

Because students are not expected to work fluently with the standard addition and subtraction algorithms until grade 4, topics A and C are intentionally devoted to Level 3 addition and subtraction methods, in which students use simplifying strategies to make simpler problems. This gives students time to work through and to make connections between various strategies. As students apply place value understanding from module 1 and leverage familiar tools, they develop confidence and flexibility. While students are not expected to master all of the Level 3 strategies, they are expected to reason about the numbers in a problem and to consider efficient solution paths by using tools and written recordings. This builds their capacity toward mental math.

Addition and subtraction problems are presented horizontally throughout grade 2. A vertical presentation implies use of the standard vertical form notation. In contrast, a horizontal presentation is more conducive to students thinking flexibly about number relationships to choose the most efficient strategy.

Methods for Addition and Subtraction:

Level 1: Count all

Level 2: Count on by ones

Level 3: Make a simpler addition or subtraction problem. These methods often use the associative property:

- *Decompose addends to add or subtract like units*
- *Use benchmark numbers to count on or count back*
- *Use compensation to adjust numbers*
- *Decompose addends to make or take from a ten or a hundred*
- *Think of subtraction as an unknown addend problem.*

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How is the analog clock related to the number line?

Students identify a relationship between the analog clock and the number line by counting units of five. As they skip-count by fives in unit form (1 five, 2 fives, 3 fives, ... , 12 fives), students relate the number of fives to the number of minutes that have passed (5, 10, 15, ... , 60). For example, when the minute hand is pointing to the 2 on the analog clock, a student may say, "2 fives have gone by, so 10 minutes have passed."

This grade 2 understanding of time intervals on a horizontal number line is applied to work in grade 3, when students solve elapsed time word problems.

Why do you show new groups below when adding in vertical form?

The decision to show newly composed units on the line below the addends, as opposed to above, has several advantages that support conceptual understanding with the standard algorithm:

1. *The digits are written in close proximity to each other, so students do not see them as unrelated. The close proximity reduces the likelihood of students reversing the order of the numbers when recording the regrouping.*
2. *When composing a new unit, students write the teen number in order, for example as 1 new unit of ten on the line first and then the additional ones next to it below the line. It is natural for students to write numbers in their usual order (e.g., 1 then 6), rather than the reverse.*
3. *Since students typically add digits from the top down in a given column, the additional 1 can be easily counted on to a larger sum at the end.*

Which word problem types, or addition and subtraction situations, are used?

Grade 2 students are expected to master all addition and all subtraction problem types by the end of the year. They revisit types that were introduced and mastered in kindergarten and grade 1. However, in grade 2, the problems are one- and two-step, and use numbers within 100 (not just within 20).

- ***Add to with result unknown:*** *Both parts are given. An action joins the parts to form the total.*

  Beth has 1 quarter and 13 pennies. Sam gave her 2 quarters and 1 dime. How much money does Beth have now?

- ***Take from with result unknown:*** *The total and one part are given. An action takes away one part from the total.*

  Sal has 2 quarters, 2 dimes, and 6 nickels. He buys a ball for 76 cents. How much money does Sal have left?

- ***Take from with change unknown:*** *The total and the resulting part are given. An action takes away an unknown part from the total.*

  Pam has 1 dollar in coins. She loses some. Now she has 4 dimes, 3 nickels, and 17 pennies. How much money did Pam lose?

- ***Put together/take apart with total unknown:*** *Both parts are given. No action joins or separates the parts. Instead, the parts may be distinguished by an attribute like type, color, size, or location.*

  Ling runs 70 yards. Pam runs 30 yards more than Ling. How many yards do Ling and Pam both run?

- ***Put together/take apart with both addends unknown:*** *Only the total is given. Students take apart the total to find both parts. This situation is the most open-ended because the parts can be any combination of numbers that make the total.*

  Jill has 100 cents in her pocket. What coins might Jill have in her pocket?

- ***Put together/take apart with addend unknown:*** *The total and one part are given. No action joins or separates the parts.*

  The blue rocket is 25 inches long. The green rocket is longer than the blue rocket. The two rockets are 57 inches altogether. How much longer is the green rocket than the blue rocket?

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- ***Compare with difference unknown:*** *Two quantities are given and compared to find how many more or how many fewer.*

  Ann has 2 quarters and 13 pennies. Kate has 34 cents. Who has more money? How much more money?

- ***Compare with bigger quantity unknown:*** *The smaller quantity and the difference between the quantities are given.*

  Nick has 18 cents more than Jack. Jack has 1 quarter, 3 dimes, 4 nickels, and 2 pennies. How much money does Nick have?

- ***Compare with smaller quantity unknown:*** *The bigger quantity and the difference between the quantities are given.*

  A silver rocket travels 56 yards on its first launch. The rocket travels 14 yards less on its second launch. What is the total distance in yards the silver rocket travels?

The following problem types tend to be among the most challenging subtypes for grade 2 students and are lightly addressed in this module. Because this module focuses on two-step word problems, and many students are still developing proficiency with the most challenging subtypes, two-step word problems do not involve these problem types.

- ***Take from with start unknown:*** *The part that represents the take from action and the resulting part are given. The unknown is the starting quantity, or total.*

  Alex has some money in his pocket. He buys lunch at the diner. Alex pays with 3 five-dollar bills, 2 ten-dollar bills, and 7 one-dollar bills. Now he has $49 left in his pocket. How much money did Alex have in his pocket to start?

- ***Compare with smaller quantity unknown*** *(more suggests wrong operation): The larger quantity and the difference between the quantities are given.*

  Tim and Pam run on the basketball court. Pam runs 94 feet. Pam runs 44 feet more than Tim. How many feet does Tim run?

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Grade 3:

Does Grade 3 have examples of elapsed time passed the hour?

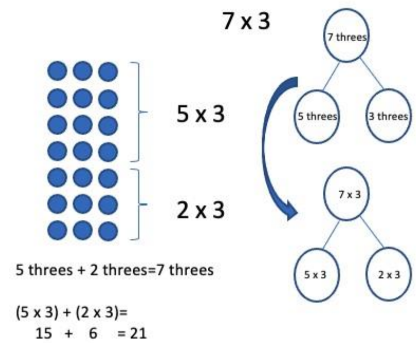
Eureka Math TEKS does not include elapsed time passed the hour. We recommend customizing Module 2 to include elapsed time questions crossing the hour.

Why does Grade 3 teach Order of Operations?

Grade 3 Module 3 applies a strategy using the distributive property and commutative property to relate multiplication facts as stated in the TEKS.

3.4E- represent multiplication facts by using a variety of approaches such as repeated addition, equal-sized groups, arrays, area models, equal jumps on a number line, and skip counting.

We want students to have multiple entry points when solving problems. If students struggle with a multiplication fact such as 7 x 3, they will be able to use another approach, such as decomposing an array model (concrete) into easier facts (5 x 3) + (2 x 3).



Why are 3rd grade students working with fractions that have denominators other than that of 2, 3, 4, 6, and 8.

The writers decided to have students work with a variety of fractional units, including additional fractional units not part of the Grade 3 standards, such as fifths, ninths, tenths, and twelfths in order to combat rigid thinking. The purpose was to encourage students to see any number as a fractional unit and to easily bridge them into Grade 4 and 5 content. You will notice, however, the Module 5 assessments do not test the additional fractions.

Why does Grade 3 Module 5 include fractions greater than 1?

Grade 2 students count fractions greater than 1 as three halves, four halves, and so on. Eureka Math TEKS continues this story in Grade 3 because we don't want to embed the misconception that fractions only exist between 0 & 1. We strongly recommend teaching Grade 3 Module 5 module as is.

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Why does Grade 3 begin with Multiplication and Division and not place value?

We certainly understand that addressing multiplication and division before place value in Grade 3 probably represents a departure from what you are used to. Here are the reasons why we sequenced the first three Grade 3 modules the way we did. Grade 2 students study place value with numbers to 1200, and so do students in Grade 3. The goal of Grade 3 work is building fluency with what students came to understand in Grade 2. In Grade 2, using place value strategies to add and subtract is part of the major work of the grade level (and K-2 grade band). As a result, Grade 2 spends nearly 1 third of the year studying place value within 1200, building conceptual understanding. The Grade 3 curriculum assumes that students have experienced this intensive study and works toward bringing those skills to fluency. As a result, Grade 3 contextualizes review of Grade 2 place value concepts in a study of metric measurement, and quickly moves from pictorial to practice with abstract place value representations that are applied to addition, subtraction, and rounding. A reason why this work comes in G3 M2 instead of G3 M1 is that, for the most part it isn't new to students.

On the other hand, multiplication and division (which is the major work of the grade level and 3-5 grade band) is new to students. Although they had a preview of equal groups in G2 M6, G3 M1 really kicks off students' study. Almost all Grade 3 teachers agree that helping students to commit their multiplication facts to memory is time consuming, requires repetitive practice, and that it's difficult for many students. Many Grade 4 and Grade 5 teachers point out that students don't have fluency with facts from 0-10 by the time they reach those grade levels. Our thinking with placing multiplication and division first was, why not give G3 students the maximum amount of time possible to master these facts by starting on Day 1? That seems even more logical to us given the strong foundation they have with place value from Grade 2.

Teachers will notice that G3 M1 specifically addresses factors of 2, 3, 4, 5 and 10. That's because these are usually the easiest for students to work with. Skip counts using these factors are typically accessible to students, as is some degree of fluency with repeated addition and subtraction. Part of the reason for using study of place value between the 2 modules on multiplication and division (G3 M1 and G3 M3) is to give students another 25 days to continue to work on their multiplication and division skills with 2, 3, 4, 5, and 10. The fluencies in G3 M2 keep practice with these factors going, so that by the time students get to G3 M3, they are on relatively solid ground with the first factors they studied. The confidence that students have built with these factors by the time they reach G3 M3 allows G3 M3 L1 to feel exciting: Students can shade in many "known" facts on the times table chart when working on the Problem Set in that lesson to see how far they've come. That lesson kicks off G3 M3's study of factors that are usually more difficult for students (0, 1 - because of conceptually understanding their patterns - 6-9, and multiples of 10). With some understanding of factors of 2, 3, 4, 5, and 10 built up over the course of the 2 previous modules, students are ready to focus on the more challenging factors and skills presented in G3 M3.

Thus, a second reason for sequencing place value second, is to maximize the amount of time during the year that students have to commit their facts to memory, and also to allow them to first build confidence with a small set of "easier" factors before moving on to more challenging ones. Multiplication concepts are the basis of much of the other work in grade 3 (e.g., area of plane figures, building fractions from unit fractions, and scaled bar and picture graphs). Beginning the year with multiplication allows for rich connections and enables multiplication to be the lens through which other concepts are explored.

A third reason is that if G3 M1 and G3 M3 were placed next to each other in the year, teachers and students would be studying multiplication and division for about 60 days straight. That wears everyone out. It also wouldn't allow the space for repetitive practice with just a few factors that's built into G3 M2's fluency.

Why do lessons focus on certain representations and tools for multiplication and division? Is it acceptable for students to use other representations and tools when they are not included in a lesson?

Most lessons include multiple representations and tools to facilitate access for all students. Allow students to demonstrate their understanding using representations and tools that make sense to them, even if those representations or tools are not a focus in the lesson.

Why is the vertical number line a primary tool used for rounding?

The vertical number line is introduced in familiar contexts. Students interpret the scale on a beaker and the scale on a thermometer as vertical number lines when measuring liquid volume and temperature. This activity provides natural opportunities for discussions about benchmark numbers, more or less than halfway, and informally rounding amounts by using about. Students apply these experiences to rounding numbers to the nearest ten and hundred.

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Why are so many addition and subtraction algorithms used?
Fluency means accurately, efficiently, and flexibly applying strategies and algorithms to solve problems. A strategy or algorithm may be efficient for solving one problem but time-consuming for another (e.g., the standard algorithm may not be the most efficient strategy for finding 500 − 499). Students analyze problems and select efficient solution strategies, many of which develop into mental math over time. They record their work in a way that makes sense to them.

Students are not expected to master all the strategies taught in module 2 topics C and D. Rather, they are expected to make informed decisions about which strategy to use on a problem-by-problem basis. For example, when the standard algorithms for addition and subtraction are taught, students are expected to evaluate each problem and select an efficient method, which may or may not be the standard algorithm, and recording notation that will help them find the correct answer. Throughout grade 3, addition and subtraction problems are intentionally presented horizontally. A vertical presentation implies use of the standard algorithm and vertical form notation. In contrast, a horizontal presentation is more conducive to students thinking flexibly about number relationships to choose the most efficient strategy.

Why relate metric units to the place value system?
One of the advantages of the metric system of measurement is its base-ten structure. In grade 2, students connect the base-ten system and the metric system for measuring length by using centimeters and meters. Relating place value concepts to measurement provides a natural application to strengthen understanding and highlight connections. The composition and decomposition of 1 thousand as 10 hundreds, 100 tens, and 1,000 ones parallels the composition and decomposition of 1 kilogram as 10 hundred grams, 100 ten grams, and 1,000 grams and 1 liter as 10 hundred milliliters, 100 ten milliliters, and 1,000 milliliters. Tens and hundreds are used to show the progression from 1 to 1,000, but emphasis is placed on creating the new units of 1 liter and 1 kilogram from milliliters and grams.

Why are some measurement units, such as milliliters and degrees, included in lessons?
Selectively including milliliters and degrees provides opportunities to make rich connections that would not be possible without addressing those units. For example, by working with milliliters, students can see that the structure for measuring metric liquid volume is the same as the structure for measuring metric weight and that those structures are similar to the place value system. Similarly, students' understanding of the vertical number line for measurement and rounding is enhanced when the scale on the thermometer is connected to the vertical number line, thereby introducing a unit, degrees Fahrenheit, that is familiar outside their study of mathematics. Because they are likely to encounter the units introduced in these lessons outside the classroom, familiarity with these units can help students better understand their experiences.

Grade 4:

Grade 4 STAAR includes 2-digit by 2-digit multiplication. Do my students need to master the standard algorithm in Grade 4 to be successful on the STAAR?

A basketball team plays 82 games each year. How many games will the team play in 25 years?

A 1,050

B 2,040

C 2,090

D 2,050

https://tea.texas.gov/student-assessment/testing/staar/staar-released-test-questions

4.4D: *The student is expected to use strategies and algorithms, including the standard algorithm, to multiply up to a four-digit number by a one-digit number and to multiply a two-digit number by a two-digit number. Strategies may include mental math, partial products, and the commutative, associative, and distributive properties*

To align to the rigor of the TEKS, students should learn multiple strategies including mental math, partial products, and the commutative, associative, and distributive properties. In Eureka Math TEKS Edition students will have a balance of conceptual and procedural understanding. Having this balance will allow students to be able to problem solve real-world situations along with college and career work.

Teaching only procedural allows for students to have in the moment understanding that does not last. In Eureka Math TEKS Edition students will learn how to solve the above STAAR example by being exposed to multiple strategies, as stated in the TEKS. When students draw and associate things connected to the algorithm, the more likely they can pull things out.

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Why is the vertical number line used for rounding?
The vertical number line is used to help support conceptual understanding of rounding. In grade 3, students first see the vertical number line as an extension of reading a vertical measurement scale. Using the context of temperature, students identify the tens (i.e., benchmarks) between which a temperature falls, the halfway mark between the benchmark temperatures, and the benchmark temperature the actual temperature is closer to. Students then generalize to round numbers to the nearest ten and hundred.

In grade 4, students round numbers with up to 6 digits to any place. They continue to use the vertical number line as a supportive model. Labeling the benchmark numbers and halfway tick mark in both standard form and unit form helps emphasize the unit to which a number is being rounded. This way, the place values line up vertically, helping students see the relationship between the numbers.

The pictorial support of the vertical number line when rounding is eventually removed, but the conceptual understanding of place value remains as students round mentally. These experiences with the vertical number line prepare students for representing ratios with vertical double number lines and graphing pairs of values in the coordinate plane.

Why are multiplication and division included together within module 3 rather than having one module dedicated to multiplication and one module dedicated to division?
Module 3 in grade 4 is structured similarly to the introduction of multiplication and division in modules 1 and 3 in grade 3—the modules are distinguishable by number choice rather than by operation, and they highlight the relationship between multiplication and division. Eureka Math TEKS edition focuses on multiplying two-digit numbers by one-digit numbers by naming the two-digit numbers as tens and ones, and on dividing two-digit and three-digit numbers by one-digit numbers by naming the two-digit and three-digit numbers as tens and ones. We build fluency with multiplication and division and extend the work up to four-digit numbers—thousands, hundreds, tens, and ones. In both modules, students can use their understanding of multiplication to find quotients by thinking of division as an unknown factor problem. Similar models, strategies, and recording methods provide coherence with each operation to support students' conceptual understanding of multiplication and division.

Why are multiple models used for multiplication and division?
Multiple models are used for multiplication and division to support student understanding. Students use place value disks, drawings on a place value chart, area models, and equations written in unit form and standard form.

The use of place value disks, drawings on a place value chart, and equations written in unit form support students in isolating the individual place value units in the total and in each equal group. When students identify a number of units, they can use familiar multiplication and division facts to find the number of each unit in the product or quotient. This builds a foundation for students to understand the value of each digit as they record multiplication and division vertically in module 3.

Representing multiplication and division with area models begins in grade 3 and continues through grade 5 and beyond. The area model is used for both multiplication and division and demonstrates the relationship between the two operations, whether used with whole numbers, fractions, or algebraically. The area model is also useful for keeping track of how a number, either the total or a factor, is decomposed and for ensuring that each part of that number is multiplied or divided. As the numbers get larger, the area model can be more efficient to draw than other models and can be a helpful scaffold in the movement from pictorial representations to abstract recordings.

The common thread between the models and methods is the distributive property. When multiplying, students see a multi-digit factor broken apart and see that each part is multiplied to find partial products. When dividing, students see how the total is decomposed and how each part is divided to find partial quotients.

Are strip diagram and an area model the same thing? Why might both be drawn when problem solving?
Strip diagrams are used to help students make sense of word problems and show the relationship between what is known and unknown in a word problem. Students use strip diagrams to find solution paths and then use another means to find their answers. For example, they might see from a strip diagram that they need to multiply 75 by 4 to solve a problem. The strip diagram does not help them to multiply 4 and 75, but an area model can. An area model is used to show the relationship between the factors and product or the relationship between the total, divisor, and quotient. With multiplication, students use the area model to show one factor broken into smaller parts, usually by place value, that are more manageable to multiply. With division, students use the area model to show the total broken into smaller parts that are more manageable to divide.

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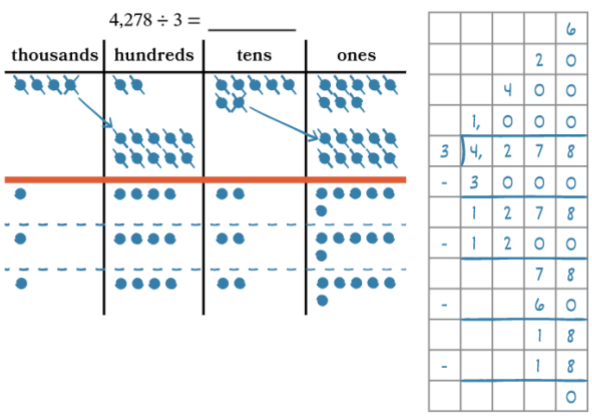
What is the intent of using vertical form for multiplication and division?

In grade 4, students multiply and divide by using strategies based on place value and the properties of operations. This module uses the representations of place value charts, area models, and vertical form because they are based on place value understanding. The intent of vertical form is to provide a written method to record the process of multiplication and division by using partial products and partial quotients. Vertical form can be more efficient than representing a problem with an area model or a place value chart. Because students mature in their understanding of multi-digit multiplication and division at different times, expect and accept a variety of representations. Fluency with the multiplication and division algorithm is not expected until grade 5 and grade 6, respectively.

Why is vertical form introduced alongside the place value charts for multiplication and division?

Similar to what students experience with addition and subtraction, vertical form is introduced alongside the place value chart for multiplication and division to support conceptual understanding and the transition from a pictorial representation to a written representation. Each action represented in the place value chart (e.g., renaming units, adding or subtracting like units, distributing units, finding the total quantity of each unit) has a direct connection to a recording within vertical form. As students become proficient with recording in vertical form, they internalize the process and no longer require drawing on the place value chart to find the unknown or explain their work.

Additionally, students not yet fluent with multiplication and division facts may find the place value chart helpful in keeping track of their calculations within vertical form.



Why are so many addition and subtraction strategies used?

The strategies used for adding and subtracting fractions and mixed numbers in Grade 4 reflect the strategies students use in grades 1, 2, and 3 to add and subtract whole numbers. These strategies reinforce the idea of fractions as numbers—we can perform operations with fractions similar to the way we perform operations with whole numbers. Because fractions are numbers, they can be composed and decomposed. Students apply the part total relationship found in addition and subtraction problems to compose and decompose the units of the parts and total.

Fluency means being accurate and efficient and flexibly applying strategies to solve problems. A strategy may be efficient for solving one problem but time consuming for another. Students analyze problems and select efficient strategies, many of which develop into mental math over time. They select a model to record their work in a way that makes sense to them. Students are not expected to master all the strategies and models taught. Rather, they are expected to make informed decisions about which strategy to use on a problem-by-problem basis.

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Grade 5:

Why does Eureka Math go beyond the TEKS in Grade 5?

The standards were used as the foundation in building out the curriculum. There will be several areas throughout the curriculum where we meet and exceed the student expectation associated with the specific TEKS. Many times, the activities students engage in are to both prepare for the lesson that they are currently immersed in, but also to prepare for upcoming concepts. The standard only requires 3 x 2-digit multiplication. However, we are having students attempt to do 4 x 3-digit multiplication. As a result, students will have to display mastery of 3 x 2 digital multiplication in order to successfully answer the 4 x 3-digit problems. The state of TX requires that at minimum the standard is covered not that the standard is the ceiling to which students are held too.

In the specific case of Grade 5 Module 2 multiplication, the larger factors are meant to help with pattern recognition and with the concept of partial products. Since 3- by 2-digit is such a specific case, we don't want students to think that "this is the procedure for 3- by 2-digit multiplication, and next year, we'll learn the procedure for using larger factors." Instead, we want them to understand the underlying concepts and build stable patterns in learning the "steps" of the multiplication algorithm, regardless of how many digits are in each factor.

This was important to keep so that students would build a deeper understanding of the patterns in partial products that staying expressly within the standard would prevent. Multiplying by multiples of 100 in addition to multiples of 10 required by two-digit factors is an important part of that pattern building.

All that said, this is a difficult year where you have to make hard choices about what to teach, and we absolutely understand that. You have the freedom to "Hone the Lesson" if right now is not the time to focus on 3- and 4-digit factors. One way to approach the equations that go beyond 3- by 2-digit is to have students set up those problems using the area model, discuss what's the same and what's different with the various area models, and why that is.

Why does Eureka Math teach a whole x mixed number when the standard only requires whole x fraction?

Multiplication of a whole number times a mixed number is an application of the grade-level concept of multiplying two whole numbers and multiplying a whole number and a fraction. Consider customizing for your students who are not yet ready to apply this grade-level concept to a mixed number times a whole number.

Why do we not teach PEMDAS in Grade 5?

5.4(F) simplify numerical expressions that do not involve exponents, including up to two levels of grouping

2019 – Q2

Rebecca bought air filters at a store.

- She bought 8 air filters.
- Each air filter cost $16.95.
- Rebecca used a coupon for $7.50 off her total cost of the air filters.

The total cost in dollars that Rebecca paid for these 8 air filters can be represented by this expression.

$$(8 \times 16.95) - 7.50$$

How much did Rebecca pay for these 8 air filters?

F $80.70

G $143.10

H $128.10

J $75.60

5.4(F) simplify numerical expressions that do not involve exponents, including up to two levels of grouping

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5.4(F) simplify numerical expressions that do not involve exponents, including up to two levels of grouping

2021 – Q19

19 What is the value of this expression?

$$10[3 + (7 + 5) \div 3]$$

A 14

B 34

C 50

D 70

https://tea.texas.gov/student-assessment/testing/staar/staar-released-test-questions

It's always hard to know how much to explicitly teach order of ops. Teaching in context rather than by rule seems to be a much more effective way for students to understand grouping more intuitively rather than confusing rules around the old PEMDAS ploy. This is usually an area where teachers are very strongly influenced by their own experiences as students and think that order of operations must be drilled to be mastered. However, the way students use/see grouping symbols (especially around the work in M6 and coordinate plane) has a bigger impact ultimately on retention of order of operations without the backlash of rule overgeneralization.

When looking at the TEKS released items, there was one instance of a two-level grouping that would not have been done in the correct order anyway. There was none that really required students to be able to solve something that didn't already have a context around it or already in the right order to get the correct answer. There was only one that really required a true "two level" understanding, but the other one is more straightforward. Even with that example, knowledge of order of ops isn't needed because they would get the right answer even if they just worked left to right. Not to mention that most students taught with eureka math would hear/see what needed to be "grouped" because of the context of the problems.

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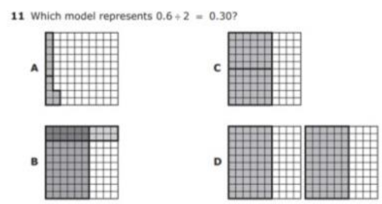
Remember, the "type of number" is immaterial when it comes to order of operations. Also, when students translate words to expressions and expressions to words, they are also working on order of operations. For example, to write an expression for "Three times as much as the sum of 5 and 6," 3 x (5+6) students are working on order of operations. They hear in the words "why" the grouping (and addition) is necessary before multiplication. This is a much more conceptual approach than teaching PEMDAS which usually creates many persistent misconceptions (like multiplication must be done before division).

Eureka Math includes expressions with parenthesis and brackets in L12 & L25 and Order of Operations in the Fluency Practice for L25. You might consider customizing some of the problems in topics C and F to include only whole numbers and decimals rather than both fractions and decimals and add more STAAR-like questions that emphasize the Order of Operations (excluding exponents)."

Order of Operations is a Grade 6 standard. Eureka Math does not call out the order of operations but does explain the use of parenthesis and brackets beginning in lesson 12.
5.4E describe the meaning of parentheses and brackets in a numeric expression;
5.4F simplify numerical expressions that do not involve exponents, including up to two levels of grouping.

Will Students be able to answer this Grade 5 question using a visual model to represent the equation?



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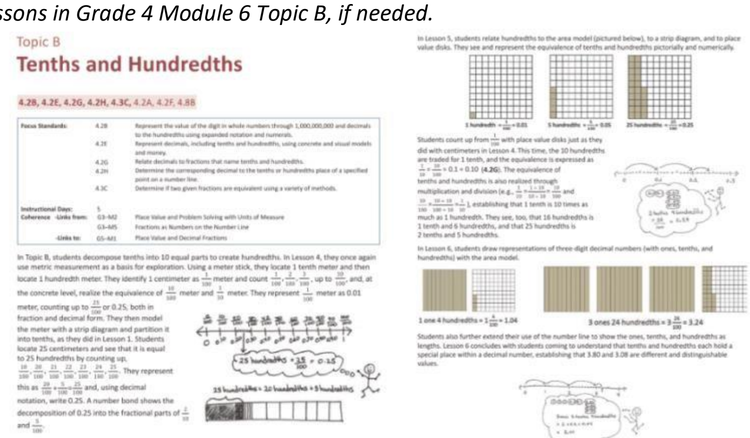
By the time students get to Grade 5, they should have the understanding of equivalent decimals, 0.6 is equal to 0.60. There are more concrete lessons in Grade 4 Module 6 Topic B, if needed.



To answer this question, students will be able to apply their thinking to new context and situations. They will be able to see the only model that represents 0.6 or 0.60 divided into two parts, equals 30 hundredths, 0.30 or 0.3.

In Grade 5, Module 2 lesson 26, this exact problem is part of the fluency activity. If teachers think additional support is needed, they can customize the lesson to meet the needs of their students by bringing in a scaffold using the hundreds chart as they work through this fluency activity. The "Divide Decimals" fluency activity is in Lessons 26-31.

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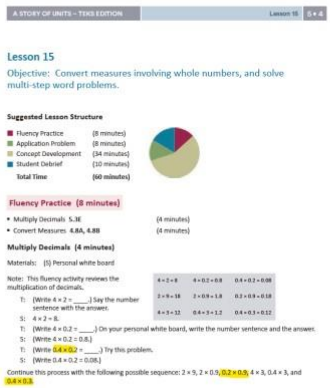
Why does Grade 5 does not teach tenths x tenths?

G5 M4 L15 & L16 have a fluency that review tenths x tenths. It doesn't use the grid model, but students do get a very brief practice with this scenario. Teachers could customize by adding the grid and a few more examples.



A STORY OF UNITS – TEKS EDITION Lesson 15 5•4

Lesson 15

Objective: Convert measures involving whole numbers, and solve multi-step word problems.

Suggested Lesson Structure

Fluency Practice	(8 minutes)
Application Problem	(8 minutes)
Concept Development	(34 minutes)
Student Debrief	(10 minutes)
Total Time	(60 minutes)

Fluency Practice (8 minutes)

- Multiply Decimals 5.3E (4 minutes)
- Convert Measures 4.8A, 4.8B (4 minutes)

Multiply Decimals (4 minutes)

Materials: (S) Personal white board

Note: This fluency activity reviews the multiplication of decimals.

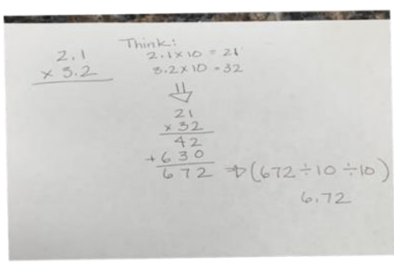
4 × 2 = 8	4 × 0.2 = 0.8	0.4 × 0.2 = 0.08
2 × 9 = 18	2 × 0.9 = 1.8	0.2 × 0.9 = 0.18
4 × 3 = 12	0.4 × 3 = 1.2	0.4 × 0.3 = 0.12

T: (Write 4 × 2 = ____.) Say the number sentence with the answer.
S: 4 × 2 = 8.
T: (Write 4 × 0.2 = ____.) On your personal white board, write the number sentence and the answer.
S: (Write 4 × 0.2 = 0.8.)
T: (Write 0.4 × 0.2 = ____.) Try this problem.
S: (Write 0.4 × 0.2 = 0.08.)

Continue this process with the following possible sequence: 2 × 9, 2 × 0.9, 0.2 × 0.9, 4 × 3, 0.4 × 3, and 0.4 × 0.3.

Teaching decimal by decimal multiplication without the underpinning of understanding fraction by fraction makes it incredibly difficult for students to have a conceptual understanding of taking "part of a part". If students are taught to count places and move decimals, they aren't actually understanding what the product means.

Teachers could teach students to rely on compensation techniques of tenths by tenths to teach decimal multiplication apart from fraction by fraction.



To do compensation, students have to understand that the product is 100 times bigger than it should be so it has to be divided by 100 to get the correct product. Then, there will need to be a lot of conversation around "where's the only place that makes sense to put the decimal when multiplying around 2 by around 3? 672? 67.2? 6.72?"

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Reference:
Retrieved from: https://tea.texas.gov/student-assessment/testing/staar/staar-released-test-questions