

# **Mathematics Curriculum**



# Implementation Guide for Eureka Math<sup>®</sup> TEKS Edition

# Introduction

*Eureka Math® TEKS Edition* is a clearly sequenced and comprehensive educational program that provides teachers with the knowledge and tools necessary to support students in building the grade-level mathematical concepts outlined in the Texas Essential Knowledge and Skills (TEKS) while developing as thinkers and doers of mathematics.

The first key feature of *Eureka Math TEKS Edition* is how the curriculum tells the unfolding story of mathematics as expressed in the standards, lesson by lesson, throughout each grade. The story draws together disparate ideas of different quantities as it emphasizes key themes: the creation and manipulation of units and the relationships among those units.

The second key feature of *Eureka Math TEKS Edition* is its major focus on meaningful assessment. Well-designed materials quickly and accurately identify student misconceptions and misunderstandings around content. Because assessment tools promote self-monitoring and self-improvement, they also serve as learning devices for students and are essential for creating effective student-teacher partnerships. The teacher who once might have said "I taught the standard to my students, and I hope they understand it," can now assert, "My students and I collaborated on that standard until they understood it. Here, let them show you how they've mastered it."

The third key feature of *Eureka Math TEKS Edition* is an engaging lesson structure that helps teachers lead students through fast-paced practice, encourage perseverance, and foster thoughtful development of understanding. The lesson structure helps teachers focus their energy on engaging students in the mathematical story through the introduction of challenging problems that call for quantitative and creating thinking. At the same time, lessons provide puzzle-solving tools and models and help students identify common patterns so that their understanding of subjects such as algebra extends naturally from students' knowledge of numbers.





## **Curriculum Design**

The curricular design for *Eureka Math TEKS Edition* is based on the principle that mathematics is most effectively taught as a logical, engaging story. The story's main character is the unit—the basic building block of arithmetic. Themes such as measurement, place value, and fractions run throughout the story line, and each is given the amount of time proportionate to its role in the overall story. The story climaxes when students learn to add, subtract, multiply, and divide fractions and to solve multistep word problems with multiplicative and additive comparisons.

Few U.S. textbooks paint mathematics as a dynamic, unfolding tale. Many textbooks instead prioritize teaching procedures and employ a spiraling approach in which topics are partially taught and then returned to—sometimes years later—with the unrealistic expectation that students will somehow connect the dots. Teaching procedures as skills without a rich context is ineffective. Students can too easily forget procedures and will fail if they do not have a deeper, more concrete knowledge from which they can draw.

## The Significance of the Unit

Even as new concepts are introduced, the overarching theme of defining the basic building block the unit—remains. Studying, relating, manipulating, and converting the unit allow students to add, subtract, multiply, and divide as well as complete word problems and understand concepts such as place value, fractions, measurements, area, and volume. Students learn that unit-based procedures are transferable and use them to build upon their knowledge in new ways.

### **Example 1: Addition of Like Units**

2 dogs + 3 dogs = 5 dogs

2 fours + 3 fours = 5 fours

2 centimeters + 3 centimeters = 5 centimeters

2 tens + 3 tens = 5 tens

2 tenths + 3 tenths = 5 tenths

2 eighths + 3 eighths = 5 eighths



## Example 2: Addition of Like Units with Decomposition

20 centimeters + 90 centimeters = 110 centimeters = 1 meter 10 centimeters 100 cm 10 cm 2 tens + 9 tens = 11 tens = 1 hundred 1 ten 10 tens 1 ten 2 tenths+9 tenths = 11 tenths = 1 one 1 tenth 10 tenths 1 tenth 2 eighths + 9 eighths = 11 eighths = 1 whole 3 eighths 8 eighths 3 eighths

**Example 3: Addition of Mixed Units** 

2 dogs 4 puppies + 3 dogs 5 puppies = 5 dogs 9 puppies

2 tens 4 ones + 3 tens 5 ones = 5 tens 9 ones

2 feet 4 inches + 3 feet 5 inches = 5 feet 9 inches

2 hours 4 minutes + 3 hours 5 minutes = 5 hours 9 minutes

2 wholes 4 eighths + 3 wholes 5 eighths = 5 wholes 9 eighths = 6 wholes 1 eighth 8 eighths 1 eighth

Once the units are established and defined, students can notate them more abstractly as appropriate. See the following examples:

$$24 + 35 = 59$$
$$2\frac{4}{8} + 3\frac{5}{8} = 5\frac{9}{8} = 6\frac{1}{8}$$
$$\frac{8}{8} = \frac{1}{8}$$



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# How *Eureka Math TEKS Edition* Aligns with the Mathematical Process Standards

## Mathematical Process Standards<sup>1</sup>

The student is expected to:

- A. apply mathematics to problems arising in everyday life, society, and the workplace;
- B. use a problem-solving mode that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;
- C. select tools, including real objects, manipulatives, paper and pencil, and technology, as appropriate and techniques, including mental math, estimation, and number sense, as appropriate to solve problems;
- D. communicate mathematical ideas, reasoning, and their implications by using multiple representations, including symbols, diagrams, graphs, and language as appropriate;
- E. create and use representations to organize, record, and communicate mathematical ideas;
- F. analyze mathematical relationships to connect and communicate mathematical ideas; and
- G. display, explain, and justify mathematical ideas and arguments by using precise mathematical language in written or oral communication.

The Mathematical Process Standards are embedded throughout the curriculum, seamlessly woven into each lesson through various components of delivery that require the level of thinking and behaviors that the practices embody. A few examples follow.

- *Eureka Math TEKS Edition* is committed to consistently engaging students in solving multistep problems. Purposeful integration of a variety of problem types that range in complexity naturally invites children to analyze givens, constraints, relationships, and goals.
- Students use models, drawings, numeric representations, and precise language to make their learning and thinking understood by others.
- Time for debriefing is included in every daily lesson plan and represents one way in which the curriculum integrates this standard. During debriefs, teachers lead students in discussions or writing exercises that prompt students to analyze and explain their work, reflect on their own learning, and make connections between concepts.

## **Lesson Structure**

Each lesson in *Eureka Math TEKS Edition* is structured to incorporate fluency activities along with the development of conceptual understanding, procedural skills, and problem solving. These components are taught through the deliberate progression of material from concrete to representational to abstract. Lesson components and stages of instruction within those components are designed to help students reach higher and higher levels of understanding.

<sup>&</sup>lt;sup>1</sup> Texas Essential Knowledge and Skills for Kindergarten–Grade 12: 19 TAC Chapter 111, Mathematics. Austin, TX: Texas Education Agency, 2012.



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Patterns and connections between concepts, tools, strategies and real-world applications naturally surface with this type of balanced approach to lesson design.

## **Fluency Practice**

Fluency is designed to promote automaticity by engaging students in practice in ways that energize them. Automaticity is critical so that students avoid depleting their attention resources with lower-level skills when they are addressing higher-level problems. This automaticity prepares students with the computational foundation to enable deep understanding in flexible ways.

## **Concept Development**

Concept Development constitutes the major portion of instruction and generally comprises at least 20 minutes of the total lesson time. It is the primary lesson component in which new learning is introduced. Intentional sequencing of standards and topics within modules ensures that students have the requisite understanding to fully access new learning goals and integrate them into their developing schemas. Much of the Concept Development instruction articulates the standards and topics through a deliberate progression of material from concrete to representational to abstract. This structure complements and supports an increasingly complex understanding of concepts.

## **Application Problems**

*Eureka Math TEKS Edition* is designed to help students understand how to choose and apply the correct mathematical concepts to solve real-world problems. To achieve this, lessons use tools and models, problems that cause students to think quantitatively and creatively, and patterns that repeat so frequently that students come to see them as connected to their environment and other disciplines. A range of problems presented within concepts serve multiple purposes: single-step word problems help children understand the meaning of new ideas, and multi-step word problems support and develop instructional concepts.

Lessons provide Application Problems that directly relate to the Concept Development. The systematic, transferable approach of Read–Draw–Write (RDW) is suggested: Read the problem, draw and label, write a number sentence, and write a word sentence. The more often students use a systematic approach to reason through problems, the more they internalize those behaviors and thought processes.

### **Student Debrief**

Rather than stating the objective of the lesson to the students at the beginning, students engage in the dynamic action of the lesson first. Then teachers reflect back on the lesson with the students to analyze the learning that occurred. This approach allows *students* to articulate the focus of the lesson. In the Student Debrief students' metacognition is developed by helping them make connections between parts of the lesson, concepts, strategies, and tools on their own. Key vocabulary is drawn out or introduced by helping students appropriately name the learning they describe.

The goal is for students to see and hear multiple perspectives from their classmates and mentally construct a multifaceted image of the concepts being learned. Through questions that help make these connections explicit and dialogue that directly engages students in the Mathematical Process



Standards, students articulate those observations so that the objective of the lesson becomes eminently clear to them.

# **Approach to Assessments**

Assessments provide an opportunity for students to show their learning accomplishments in addition to offering students a pathway to monitor their progress, celebrate successes, examine mistakes, uncover misconceptions, and engage in self-reflection and analysis. A central goal of the assessment system as a whole is to make students aware of their strengths and weaknesses and to give them opportunities to try again, to do better, and in doing so to enjoy the experience of seeing their hard work pay off as their skill and understanding increase. Furthermore, the data collected as a result of the assessments represent an invaluable tool in the hands of teachers and provide them with specific information about student understanding to help them direct their instruction. In *Eureka Math TEKS Edition*, assessment becomes a regular part of the classroom routine in the form of daily, mid-module, and end-of-module appraisals. Both mid-module and end-of-module tasks are designed to allow for quick teacher scoring that makes it possible for teachers to implement instructionally relevant, actionable feedback to students and to monitor the resulting student progress to determine the effectiveness of their instruction and make any needed adjustments. These mid-module and end-of-module tasks should be used in conjunction with instructionally embedded tasks, teacher-developed quizzes, and other formative assessment strategies to realize the full benefits of data-driven instruction.

## **Daily Assessments**

### **Problem Sets**

As part of the Concept Development, students may be asked to complete a Problem Set. The Problem Set often includes fluency pertaining to the Concept Development as well as conceptual understanding and application word problems. The primary goals of the Problem Set are for students to apply the conceptual understandings learned during the lesson and to work at their own level for 10 sustained minutes.

## **Exit Tickets**

Exit Tickets are a critical element of the lesson structure. These quick assessments contain specific questions about what was learned that day. The purpose of the Exit Ticket is two-fold: to teach students to grow accustomed to being held individually accountable for the work they have done after one day's instruction and to provide the teacher with valuable evidence of the efficacy of that day's work—which is indispensable for planning purposes.

### Homework

Similar in content and format to the Problem Sets, the Homework gives students additional practice on the skills and concepts they learn in class each day. The idea is not to introduce brand-new concepts or ideas in the Homework but to build student confidence with the material learned in class. Because students work similar problems in class, Homework gives them a chance to check their understanding and confirm that they can complete the problems independently.



## Mid-Module Assessment Task

A Mid-Module Assessment is provided with each module. These tasks are specifically tailored to address approximately the first half of the student learning outcomes for that module. Careful language in a rubric provides guidance in understanding common student preconceptions or misconceptions for discrete portions of knowledge or specific skills on their way to proficiency for each TEKS. Typically, these tasks should be completed independently by students within one class period. The tasks should be new to the students and not preceded by analogous problems. Teachers may use these tasks either formatively or summatively.

## **End-of-Module Assessment Task**

A summative End-of-Module Assessment is also provided for each module. These tasks are specifically designed based on the standards addressed to gauge students' understanding of the module as a whole. Some items test understanding of specific TEKS while others are synthesis items that assess either understanding of the broader concept addressed in the module or the ability to solve problems by combining knowledge, skills, and understanding. For Grades 3–5, the End-of-Module Assessment includes tasks formatted to mirror the State of Texas Assessments of Academic Readiness (STAAR®) program. These items are included not only to assess students' content knowledge but also to give students experience navigating the structure of STAAR tasks. Similar to the mid-module tasks, the end-of-module tasks should be completed independently by students within one class period. These tasks should also be new to the students and not preceded by analogous problems.

# **Approach to the Spanish Translation**

To develop the most appropriate Spanish translation strategies, an in-depth analysis of the English version of the *Eureka Math TEKS Edition* was completed. Specific situations were identified in which adaptations were necessary to allow Spanish-speaking students to better understand the mathematical skills they need to develop.

The strategies implemented in *Eureka Math® Edición para TEKS* are part of a conscious design that is endorsed by experts in bilingual education from the Texas Education Agency (TEA) and a team of content area experts, math teachers, linguists, and translators from Great Minds. In addition, the language used in the TEKS has been incorporated along with stylistic preferences from the TEA.

The following is a description of the translation strategies implemented in the *Eureka Math Edición para TEKS* materials.

## Notes on Translation of Instructional Language

## Whole Number/Part-Whole

The English term *whole* refers to two related but different concepts: *whole numbers* and *part-whole*. The Spanish translation uses the term *entero* in reference to *whole numbers* (as opposed to decimals) and when it is used in opposition to the concept of *part* as a fraction and thus names the unit 1. We also refer to *entero* in the context of parts of a geometric shape.



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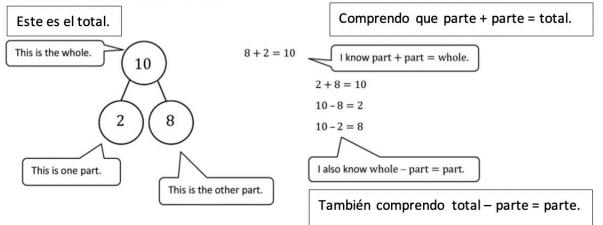
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However, the word *total* is used to refer to the result of an operation (addition, subtraction, multiplication, division) or to the unknown in a problem generally when it equals more than 1.

#### For example:

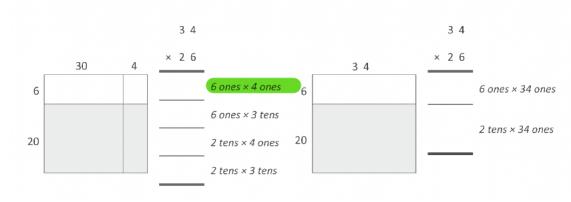
#### Fluency Practice

Making ten and adding to ten is foundational to future Grade 2 strategies. Students use a number bond to show the part-whole relationship with numbers.



#### Units

Conversely, the English terms *units* and *ones* correspond to a single term in Spanish, *unidades*. When both terms appear in the same activity in *Eureka Math TEKS Edition* in English, distinction is made in the curriculum to ensure that it does not lead to confusion: *units* = *unidades de valor de posición* (which include hundreds, tens, ones, etc.) and *ones* = *unidades*. In the example below, the term *units* has been intentionally translated as *unidades de valor de posición* to avoid any confusion with *ones*.

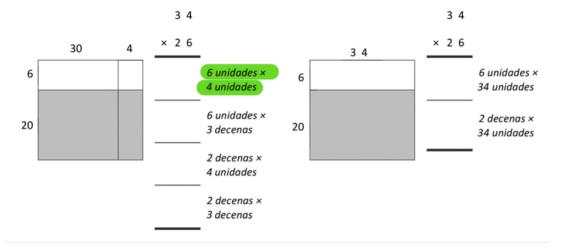


Solve 26 × 34 using 4 partial products and 2 partial products. Remember to think in terms of units as you solve. Write an expression to find the area of each smaller rectangle in the area model.



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© 2021 Great Minds PBC TEKS Edition | greatminds.org/texas  Resuelve 26 × 34 usando 4 productos parciales y 2 productos parciales. Recuerda pensar en términos de unidades de valor de posición al resolver el problema. Escribe una expresión para encontrar el área de cada rectángulo más pequeño del modelo de área.



The terms contar salteado (count by), contar saltándose números (skip-counting), contar de (X) en (X) (count by X), and contar por unidades de X (count by units of X) all refer to the strategy of counting forward on the number line without mentioning all the numbers. This strategy helps students systematize simple operations, and it is used extensively throughout the program.

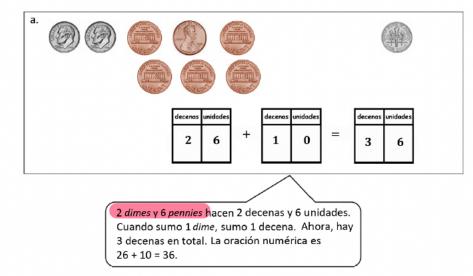
## U.S. Coins

In the last three modules of Kindergarten and Grade 1, students are introduced to the names of the main U.S. coins in both Spanish and English: moneda de 1 centavo or *penny*, moneda de 5 centavos or *nickel*, moneda de 10 centavos or *dime*, and moneda de 25 centavos or *quarter*. This information aligns with standards **K.4** and **1.4A** (The student is expected to identify U.S. coins by name.). In turn, the information contributes to enriching some activities that would otherwise have little educational value when translated into Spanish (e.g., How many cents are in a dime? / ¿Cuántos centavos hay en una moneda de 10 centavos?). In this example, if *dime* is translated into Spanish, the answer is given to the student.

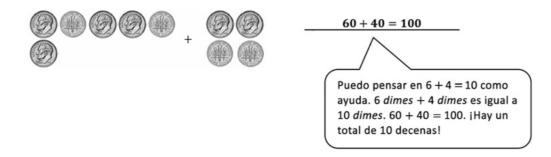
In each activity of the student-facing materials beginning with Kindergarten Module 4, the name of each coin is first introduced in a bilingual structure (e.g., moneda de un centavo o *penny*). Then, moving forward, only the English name is used.



4. Usa las monedas de 10 centavos o *dimes* y las monedas de 1 centavo o *pennies* para completar las tablas de valor de posición.



When students continue to work on the recognition of coins by name in the last module of Grade 1, coin names are used directly in English because students have had the opportunity to learn those names in previous modules.



In these modules, providing visual support to students by using posters that include pictures of the coins, their values, and their names in English is suggested. Sentence frames may also be used to review these names before starting activities that include them (e.g., 1 dime son 10 centavos. / 1 dime is 10 cents.) As a reminder of these support strategies, notes to the teacher are included in the Teacher Edition, the Family Tip Sheets, and in other specific curriculum products.

For example:

## NOTAS SOBRE LAS DIFERENTES FORMAS DE REPRESENTACIÓN

Ofrezca apoyo visual a los estudiantes con los nombres de las monedas en inglés. Cuelgue un cartel con las imágenes de las monedas, su valor y su nombre en inglés. Incluya el singular y el plural de los nombres: 1 *penny*, 2 *pennies*. Practiquen juntos diciendo los nombres de las monedas en inglés y su valor: 1 *dime* son 10 centavos.



This bilingual strategy is only implemented in the aforementioned Kindergarten and Grade 1 modules. In modules that do not work with standards **K.4** and **1.4A**, the coin names remain in Spanish.

	Kindergarten Modules 4–6 and Grade 1 Modules 4–5	Grade 1 Module 6	Kindergarten and Grade 1 Modules 1–3 and Grades 2–5
Learn, Practice,	moneda de 1 centavo	penny	moneda de 1 centavo
Succeed (LPS);	o penny		
Mid-Module			
Assessments;			
End-of-Module			
Assessments			
Family Tip Sheets	moneda de 1 centavo	moneda de 1 centavo	moneda de 1 centavo
	o penny	o penny	

However, consider using English coin names in Grades 2–5 if it is deemed to be beneficial to students given the context in which they are immersed.

## Say Ten Method

The Say Ten Method is an East Asian counting method that reinforces place value understanding by having students separate two-digit numbers into tens and ones. Because the Spanish terms *diez* and *decena* are both equivalent to the English term *ten*, this method is introduced in Kindergarten as *método Decir diez* (because students have not yet been introduced to the concept of *decenas*). The method is used as such until Grade 1 Module 2 Lesson 26 when students are introduced to the term *decena* and the method is renamed as *método Decir decenas*.

	Up to Grade 1 Module 2, Lesson 26: <i>método Decir</i> <i>diez</i>	From Grade 1 Module 2, Lesson 26 on: <i>método</i> Decir decenas
eighteen	1 diez 8	1 decena 8
forty-eight	4 dieces 8	4 decenas 8
one hundred and eight	1 cien 1 diez 8	1 centena 1 decena 8

## Use of Italics for Foreign Words

It is important to present students with real contexts that relate to their daily lives. While students' native language is Spanish, they are immersed in a bilingual world surrounded by environmental print, posters, and labels in English. With this in mind, references to terms that do not have a Spanish equivalent, such as *pretzel* and *hockey*, are preserved, but italics is used to emphasize that the term is in English.

Celebrating the characteristic multiculturalism of Texas is an important aim of the curriculum. With that objective in mind, proper names of different origins and ethnicities (e.g., Cooper, Tamika, José, Abby, MeiLing) continue to be used in *Eureka Math Edición para TEKS*.



## **Considerations for Bilingual Programs**

Whether teachers are working in a transitional bilingual education program (early-exit or late-exit) or in a dual language immersion program (one-way or two-way), they must reinforce the positive effect of bilingualism in the classroom and how it can enrich instruction for all students. During the lesson, teachers should consider taking time to make a cross-linguistic connection in which the strategies learned in one language are applied to the other language.

Teachers should emphasize the importance of knowing the academic terminology in both languages. They should also consider using word walls, content walls, word sorts, and other structures or strategies emphasizing cognates to establish bridges between the two languages. In turn, teachers should consider devoting special time to address the terminological differences of terms that do not have an equivalent in Spanish, as mentioned in the Notes on Translation of Instructional Language.

# **Differentiating Instruction**

The writers of *Eureka Math TEKS Edition* feel strongly that equitable instruction requires that all students have access to the same high-quality grade-level content and that accommodations cannot just be an extra set of resources for particular students. Instead, scaffolding must be folded into the curriculum in such a way that it is part of its very DNA. Said another way, faithful adherence to the modules is the primary scaffolding tool.

The modules reinforce that the components of excellent math instruction do not change based on the audience. There are specific resources included within the curriculum that highlight strategies that can provide critical access for all students.

Research-based Universal Design for Learning (UDL) has provided a structure for considering how to meet the needs of diverse learners. Broadly speaking, that structure asks teachers to consider multiple means of representation, multiple means of action and expression, and multiple means of engagement. Charts at the end of this section offer suggested scaffolds using this framework for English language learners and for any students who need additional support. UDL offers ideal settings for multiple entry points for students and minimizes instructional barriers to learning. Teachers should note that many of the suggestions in the charts are applicable to other students and to overlapping populations.

Additionally, individual lessons contain notes in the margins for teachers (in text boxes) highlighting specific UDL information about scaffolds that might be employed with particular intentionality when working with students. These tips are strategically placed in the lesson where the teacher might use the strategy to the best advantage.

The scaffolds and accommodations integrated into *Eureka Math TEKS Edition* change how a learner accesses information and demonstrates learning; they do not substantially alter the instructional level, content, or performance criteria. Rather, the scaffolds and accommodations provide students with choices about how they access content and demonstrate their knowledge and ability.

We encourage teachers to pay particular attention to the manner in which knowledge is sequenced in *Eureka Math TEKS Edition* and to capitalize on that sequence when working with special student populations. Most lessons contain a suggested teaching sequence that moves from simple to complex,



starting, for example, with an introductory problem for a math topic and building up inductively to the general case encompassing multifaceted ideas. By breaking down problems from simple to complex, teachers can locate specific steps that students need support with or stretch problems for students who desire a challenge

Throughout *Eureka Math TEKS Edition*, teachers are encouraged to give classwork by using a *timeframe* rather than a *task frame*. Within a given time, all students are expected to do their personal best, working at their maximum potential. Some students will complete more work than others. Students are encouraged to strive for personal success.

Another vitally important component for meeting the needs of all students is the constant flow of data from student work. *Eureka Math TEKS Edition* provides daily tracking through an Exit Ticket for each lesson as well as Mid-Module and End-of-Module assessments to determine student understanding at benchmark points. These tasks should accompany teacher-made test items in a comprehensive assessment plan. Such data flow keeps the teaching practice firmly grounded in student learning and makes incremental forward movement possible.

## Resources

To offer additional family support and support with remote learning, *Eureka Math TEKS Edition* also provides the following via the website gm.greatminds.org/texas:

## **Family Guide**

A brief overview about the development of *Eureka Math TEKS Edition*, where to locate family resources, how to create a Great Minds account to access free online resources, and additional information on math tools and models used in the curriculum (available in both English and Spanish)

## **Family Tip Sheet**

A series of tip sheets that provide families with an overview of each module in the curriculum, sample problems, ways parents can help at home, and key terms and models (available in English and Spanish)

## **Scope and Sequence Document**

Grade-level charts that provide an at-a-glance view of when each standard is addressed as a focus of instruction and assessment

## Eureka Math In Sync™ Resources

Flexible tools and resources beyond the basic *Eureka Math* curriculum for continued and enhanced instructional delivery whether schools operate in person, virtually, or through some combination. Four new core components comprise *Eureka Math in Sync*.

• The Learn Anywhere Plan—A continuous learning plan with module- and lesson-level recommendations for a full year of instruction with recommendations for flexible use in various contexts



- Video lessons—Daily videos with prioritized lesson content with closed captioning and audio in both English and Spanish
- Topic facilitation slides—Resources for each topic that provide recommended routines and questions to facilitate student discussion of essential knowledge
- Discussion-based assessment materials—Additional questions aligned to tasks on the Mid-Module and End-of-Module assessments to allow teachers to dig deeper into student thinking through a one-on-one conversation

## Eureka Math In Sync User Guide

A guide containing additional information about the specific use of each of the resources provided



