

Supporting Educators in Improving Practice Through Instructional Materials

Can curriculum and instructional materials be developed to not only support students in building knowledge and skills, but also support educators in honing their practice? Educative curriculum materials help teachers acquire new content and pedagogical knowledge, typically through embedded notes, annotations, and models of practice. The presence of educative features in a curriculum has been shown to improve teachers' instructional planning and curriculum implementation as well as student learning.

For example, teachers using highly educative mathematics curriculum materials are more likely to identify the big ideas in a curricular program while planning collaboratively and are more likely to maintain cognitive demand and elicit student thinking during a lesson (Stein and Kaufman 2010). Research also suggests that teachers who use educative curriculum materials show increases in pedagogical content knowledge and use a greater number of strategies to support student learning (Schuchardt et al. 2017).

Defining Educative Curriculum Materials

In 1996, Ball and Cohen introduced the concept of educative curriculum materials in their **seminal paper**, which suggested that curriculum resources themselves had the potential to support not only students' learning but teachers' learning as well. This idea differentiated educative curriculum materials from those that mainly focus on instruction without developing teachers' own content and pedagogical knowledge.

In 2005, researchers Elizabeth A. Davis and Joseph S. Kracjik offered five design principles to help guide the development of educative curriculum materials, stating that educative resources should do the following:

- Support teachers' learning of subject matter.
- Help teachers anticipate what learners might say or do in response to activities.
- Help teachers consider how to relate units throughout the year.
- Make curriculum developers' pedagogical judgments visible.
- Promote a teacher's capacity to make pedagogical adaptations for learners.

All Great Minds® curricula were intentionally and uniquely designed to contain educative elements because we believe in empowering teachers to not only deliver a high-quality curriculum, but also to effectively adapt it to meet the unique needs of the students in their classroom. Unlike a scripted curriculum where content is provided to educators with little to no guidance or rationale, our educative curricula help teachers improve their practice while enabling all students to achieve greatness.



Seven Educative Features Embedded in Eureka Math²™

The *Eureka Math² Teach* book—the Teacher Edition for each module in the curriculum—is the core resource that teachers use to plan for and deliver instruction. Crafted by our team of teacher-writers, the *Teach* book includes seven educative features that support teachers own learning and help them achieve flexible, high-quality math instruction for all students.

1

Module Overviews. The *Teach* book for a module begins with the **Overview**, a topic-by-topic summary that shows the development of learning throughout the module. It also provides connections to the work done before and after the module, helping teachers understand the module's underlying structure, flow of the content, and coherence of the different parts of the curriculum.

Before This Module

Grade 3 Module 1
In grade 3 module 1, students build a conceptual understanding of multiplication as a number of equal groups (e.g., $4 \times 3 = 12$ can be interpreted as 4 groups of 3 is 12).

Grade 3 Module 2
In grade 3 module 2, students compose and decompose metric measurement units and relate them to place value units up to 1 thousand. They use place value understanding and the vertical number line to round two- and three-digit numbers. Grade 3 students also add and subtract two- and three-digit numbers by using a variety of strategies, including the standard algorithm.

Overview
Place Value Concepts for Addition and Subtraction

Topic A
Multiplication as Multiplicative Comparison
Students identify, represent, and interpret multiplicative comparisons in patterns, tape diagrams, multiplication equations, measurements, and units of money. They describe the relationship between quantities as times as much as or use other language as applicable to a given context (e.g., times as many as, times as long as, times as heavy as). Students use multiplication or division to find an unknown quantity in a comparison.

Topic B
Place Value and Comparison within 1,000,000
Students name the place value units of ten thousand, hundred thousand, and million. They recognize the multiplicative relationship between place value units—the value of a digit in one place is ten times as much as the value of the same digit in the place to its right. Students write and compare numbers with up to 6 digits in standard, expanded, word, and unit forms.

Topic C
Rounding Multi-Digit Whole Numbers
Students name multi-digit numbers in unit form in different ways by using smaller units (e.g., 245,000 as 24 ten thousands 5 thousands or 245 thousands), and they find 1 more or 1 less of a given unit in preparation for rounding on a vertical number line. Students round four-digit, five-digit, and six-digit numbers to the nearest thousand, ten thousand, and hundred thousand. They determine an appropriate rounding strategy to make useful estimates for a given context.

After This Module
Grade 5 Modules 1 and 4
In grade 5 modules 1 and 4, students extend the work of grade 4 by adding, subtracting, rounding, and comparing multi-digit numbers with digits to the thousandths place. Students recognize that the value of a digit in one place is $\frac{1}{10}$ of what it represents in the place to its left.

Before This Module and After This Module look back and forward to reveal coherence across modules and grade levels.

“As a teacher, I have learned so much more about how to teach math in this one year [using Eureka Math²]—it’s just unbelievable. I was always told ‘Here’s the formula. Use it, and don’t ask why. Just do it’... But now I’m understanding the why, and it’s helping me to be a better teacher because I understand what I’m teaching. Instead of saying ‘I know it works, but I can’t tell you why it works or where it came from,’ now I actually understand it.”

—Teacher, Calcasieu Parish Public Schools

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The Why. Each module also includes a Why section that highlights and explains elements of the mathematics in the module to give teachers insight into decisions made during the writing of the module and the reasoning that concepts are taught in a particular way.

“I love the why. There was one time I was questioning why we didn’t teach something differently and then I read the why of it, and it helped me understand the reason behind the lesson. Most of the time I agree with the why, or it helps me understand why we set the lessons up the way we do.”

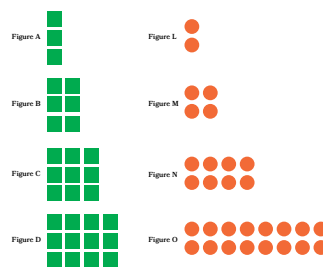
—Tonya Hill, Grade 3 Teacher Paragould School District, AR

Why

Place Value Concepts for Addition and Subtraction

Why does the place value module begin with a topic on multiplicative comparisons?

Beginning with multiplicative comparison enables students to build on their prior knowledge of multiplication from grade 3 and provides a foundation upon which students can explore the relationships between numbers and place value units. This placement also activates grade 3 knowledge of multiplication and division facts within 100 and provides students with opportunities to continue building fluency with the facts in preparation for multiplication and division in modules 2 and 3.



Students are familiar with additive comparison—relating numbers in terms of how many more or how many less. Multiplicative comparison—relating numbers as times as many—is a new way to compare numbers. Students use multiplicative comparison throughout the year to relate measurement units, whole numbers, and fractions. This important relationship between factors, where one factor tells how much larger the product is compared to the other factor, is foundational to ratios and proportional relationships in later grades. Taking time to develop this understanding across the grade 4 modules sets students up for success with interpreting multiplication as scaling in grade 5 and applying or finding a scale factor in scale drawings, dilations, and similar figures.

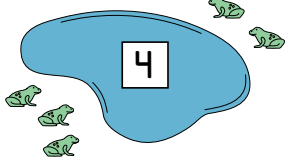
3

Topic- and Lesson-Level Supports. Within a module, small groups of related lessons are organized into topics. Each topic begins with a detailed **Topic Overview** that is a summary of the learning in that topic and typically includes information about how the content connects to previous or upcoming content. A **Progression of Lessons** chart shows a list of the lessons in the topic along with sample, student-friendly statements of each lesson's major learning.

Progression of Lessons

Lesson 13


Count on from an addend in *add to with result unknown* situations.



I don't have to show or count the first part. If I know 4 frogs are in the pond, I can just count on: Foouuur, 5, 6, 7, 8, 9.

Lesson 14

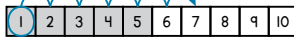
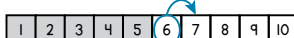
Count on to find the total of an addition expression.



I imagine holding 5 in my hand. Then I track on my fingers to count on 4 more: Fiiive, 6, 7, 8, 9.

Lesson 15

Use the commutative property to count on from the larger addend.

1 + 6 and 6 + 1 have the same total. I can add in any order. It is helpful, or more efficient, to start with the larger part.

Finally, each lesson begins with a two-page **Lesson Overview** to help teachers prepare to teach that lesson, which includes the following:

- **The Lesson at a Glance**, which provides a snapshot of the lesson's learning outcomes, tools, representations, and terminology.
- **Key Questions** to help focus teachers' instruction and classroom discourse.
- The **Exit Ticket**, which is a formative assessment given at the end of the lesson.
- **Achievement Descriptors (AD)** that are standards-aligned and detail what students should know and be able to do based on instruction. Each AD also has its own set of proficiency indicators that are more detailed and help teachers evaluate what they see in the classroom and in students' written work.

AD Code: Grade.Module.AD#










AD Language

M1

1.Mod1.AD2 Count On to Add Add by counting on using objects, drawings, equations, data, and the commutative property.

1.OA.A.1, 1.OA.B.3, 1.OA.C.5, 1.OA.C.6

Related Standard

Partially Proficient	Proficient	Highly Proficient
<p>Consistently counts all rather than counting on to add. Significant time may be needed to count or find the total, and answer may be incorrect. Students may</p> <ul style="list-style-type: none"> draw or count all objects one at a time starting at 1. <p>5 + 3</p>  <ul style="list-style-type: none"> count all rather than count on from embedded parts or known facts.  <ul style="list-style-type: none"> arbitrarily assign a number to a stated amount when not able to count the amount (struggles with concepts of cardinality), or 	<p>Counts on to add efficiently and accurately through organized counting of objects, drawings, equations; use of the commutative property; or embedded parts. Proficiently uses methods to show organized counting to add. Students may</p> <ul style="list-style-type: none"> find the total by using known groups to count on from (e.g., 5 + n, doubles).   <p>5, 6, 7, 8 6, 7, 8, 9, 10</p>  <p>7 + 6 = 13</p>	<p>Flexibly manipulates units to add, no matter how the problem is posed. May recognize smaller groups within a set and know the total of the whole set without counting how many in the groups (conceptual subitizing).</p>    

AD Indicators

“Eureka Math is an educative curriculum that teaches teachers how to do math...Last year we were going so fast. This year we were into customization and prep. We used to hear, ‘Math is not my subject.’ We’re not hearing that anymore. Instead, they’re taking the lessons and making them their own.”

—Julia Alvarez, Director of Mathematics, IDEA Public School

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Margin Notes. There are several types of instructional guidance that appear in the margins throughout the *Eureka Math² Teach* book. These notes provide information about facilitation, differentiation, and coherence. For example:

- **Teacher notes** communicate information that helps with implementing the lesson. Teacher notes may enhance mathematical understanding, explain pedagogical choices, give background information, or help teachers identify common misconceptions.
- **Differentiation suggestions** provide targeted ways to help meet the needs of specific learners based on teachers' observations or other assessments. There are two types of suggestions: support and challenge. Teachers can use these to support students in the moment or to advance learning for students who are ready for more of a challenge.

Fluency

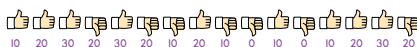
Happy Counting by Tens within 30

Students visualize a number line while counting aloud to build fluency counting within 120.

Invite students to participate in Happy Counting.

Let's count by tens. The first number you say is 10. Ready?

Signal up or down accordingly for each count.



Offer more practice counting by tens within 30. Change directions occasionally, emphasizing where students hesitate or count inaccurately.

Whiteboard Exchange: Take Out 5

Students use a number bond to decompose a number into 5 and another addend to prepare to make ten when one addend is 5.

After each prompt for a written response, give students time to work. When most students are ready, signal for them to show their whiteboards. Provide immediate and specific feedback. If students need to revise, briefly return to validate their corrections.

Display the number 6.

Write this number on your whiteboard.

Let's take out 5.



Teacher Note

The following fluency activities in module 3 topic 8 support students in maintaining fluency with the three essential skills as they transition from counting on to making an easier problem:

- Whiteboard Exchange: Take Out 5, 1, or 2
- Say Ten Push-Ups
- 10-Frame Fill Up
- 5-Group: Partners to 10
- Whiteboard Exchange: Three Addends
- Sprint: 10+ facts

Differentiation: Support

Offer a visual for students by modeling the decomposition on your fingers while you record the number bond.

Draw a circle around the 8 from the expression and the 2 from the number bond.

What is $8 + 6$?
14

Write $= 14$ to complete the $8 + 6$ equation.

Direct students to erase their whiteboards. Repeat the process with $8 + 7$, $8 + 4$, and $9 + 4$. As students are ready, reduce support and use the following questions to guide them:

- How can you break up a part in your drawing and use it to make ten?
- What three-addend expression shows how you made ten?
- How can you show how you made ten with the two-addend expression?

Display the picture of the two 5-group drawings.

These drawings show $9 + 4$ and $8 + 4$. What is the same about them?

Ten is circled in both drawings.

The larger part is on this side. (Points to the left.)

They both have 4.

The 4 is broken up to make ten.

What is different about the drawings?

The first part is different.

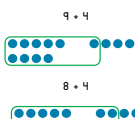
The part needed to make a ten is different.

How many does 9 need to make ten? How many does 8 need?

9 needs 1 to make ten.

8 needs 2 to make ten.

You need 2 more to make ten with 8. With 9, you only need 1 more.



Language Support

Students are familiar with the terms addend, expression, and number sentence from previous modules.

If needed, support the phrases three-addend expression and number sentence. Consider having the class sort three-addend and two-addend expressions on a chart.

2-Addend Expression	3-Addend Expression
$5 + 5$	$5 + 5 + 1$
2-Addend Number Sentence	3-Addend Number Sentence
$5 + 5 = 10$	$5 + 5 + 1 = 11$

Point or gesture while the class chorally counts how many addends they see.

UDL: Action & Expression

Expect students to require less guidance over the course of the lesson. Support them to monitor their own progress by providing questions that guide self-monitoring and reflection.

- How is this problem like the others I have done?
- What is still confusing? What can I do to help myself?
- How am I making this problem easier for myself?

- **Language support** provides ideas to help students with receiving (reading and listening) and producing (speaking and writing) English in mathematical contexts. Suggestions may include ways to promote student-to-student discourse, define new and familiar content-specific terminology or academic language, or clarify multiple-meaning words.

- **Universal Design for Learning (UDL) suggestions** offer strategies and scaffolds that address learner variance. These suggestions promote flexibility with engagement, representation, and action and expression—the three UDL principles described by CAST. These strategies and scaffolds are additional suggestions to complement the curriculum's overall alignment with UDL Guidelines.

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Lesson-Level Sample Solutions.

Sample Solutions are examples of answers to problems students will engage with during a lesson.

Although specific solution paths are provided, teachers are also encouraged to accept accurate responses, reasonable explanations, and equivalent answers for student work even if they differ from the sample.

Sample Solutions

Expect to see varied solution paths. Accept accurate responses, reasonable explanations, and equivalent answers for all student work.

Name _____

1. Make 10 to add.

Show how you know:

$5 + 2 + 5 = 12$

$9 + 1 + 8 = 18$

2. Make 10 to add.

Show how you know:

$6 + 2 + 8 = 12$

$9 + 7 + 1 = 17$

6

Visual Design. Throughout the *Teach* book, color coding and other types of text formatting are used to highlight facilitation recommendations and possible statements, questions, and student responses. These are always suggestions and are not intended to be a script. For example:

- **Dark blue** text shows suggested language for questions and statements that are essential to the lesson, and light blue text shows sample student responses.

- **Text that resembles handwriting** indicates what a teacher might write on the board. Different colors signal what a teacher would add to the board at different times during the discussion.

- **Bulleted lists** provide suggested advancing and assessing questions to guide learning as needed.

- **Text** in purple throughout the *Teach* book also shows possible student responses.

7 is one total, and 9 is the other total.
 Without cubes, how can we tell that 9 is more than 7?
 9 comes after 7.
 9 objects are more than 7 objects.
 Display the prepared sentence frame and use it to compare the totals:
 9 is greater than 7.
 We say 9 is greater than 7. Let's say this statement together.
 9 is greater than 7.

Ask students to write a repeated addition equation on their whiteboards to represent the groups.

What repeated addition equation represents the equal groups?

Write the repeated addition equation $3 + 3 + 3 + 3 = 12$.

How many threes did we add to make 12?

Write the unit form, 4 threes = 12, below the addition equation.

$3 + 3 + 3 + 3 = 12$
 4 threes = 12
 $4 \times 3 = 12$
 Multiply: 4 times 3 equals 12

Direct students to problem 1 in their books. Ask students to draw an array to show 3 rows of 5, using circles to represent the cubes.

1. Draw an array to show 3 rows of 5.



$$3 \times 5 = 15$$

7

Supplementary Resources. Near the end of the *Teach* book, teachers can find additional resources for assessment, lesson planning, and further study. These resources include a master copy of the Module Assessment, content standards and Achievement Descriptors addressed in the module, new and familiar terminology used in the module, resource lists, and more.

"I've learned a lot through using the curriculum and studying it. Eureka Math is very focused on presenting the mathematics very clearly. I think a lot of teachers don't have a strong understanding of how kids learn math, of how an algorithm works, or what you're doing when you're regrouping with addition and subtraction. The new math standards expect students to have a stronger conceptual understanding of math, and I think it's important that teachers have that too."

—Jordan Meyer, Math Intervention Teacher DC Public Schools



One of the great strengths of *Eureka Math*² is its educative nature and its usefulness as point-of-use professional development with these embedded supports. Of course, ***Eureka Math*² professional learning** is available in many forms, including professional development sessions, coaching, implementation services, and a variety of digital resources. Providing teachers with ongoing, curriculum-based professional learning is key to unlocking the potential of high-quality instructional materials.

Works Cited

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