

**EUREKA
MATH®**

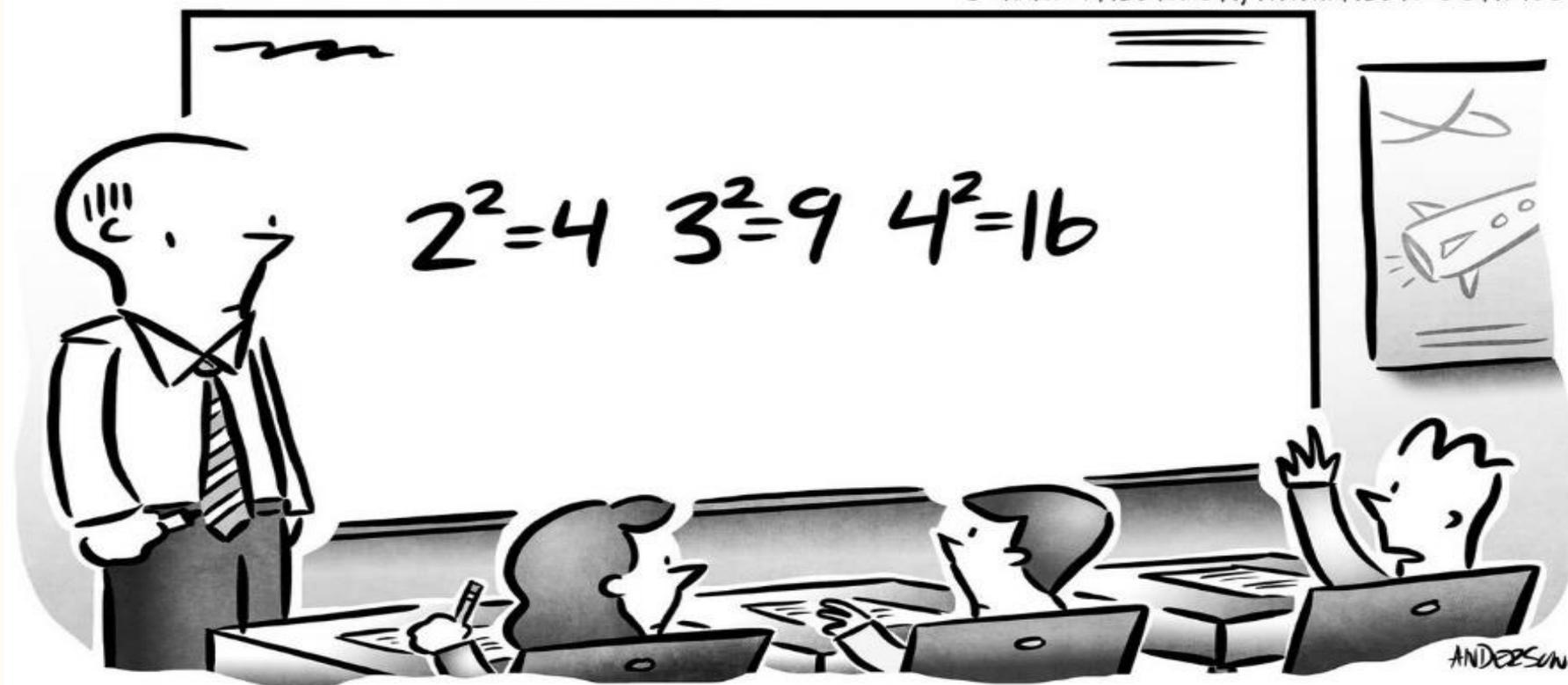


Kensington Parkwood
Elementary School

Eureka Parent Engagement Session
December 10, 2019



© MARK ANDERSON, WWW.ANDERSTOONS.COM



"Wait, we're squaring numbers now? We just figured out how to round them!"

Agenda

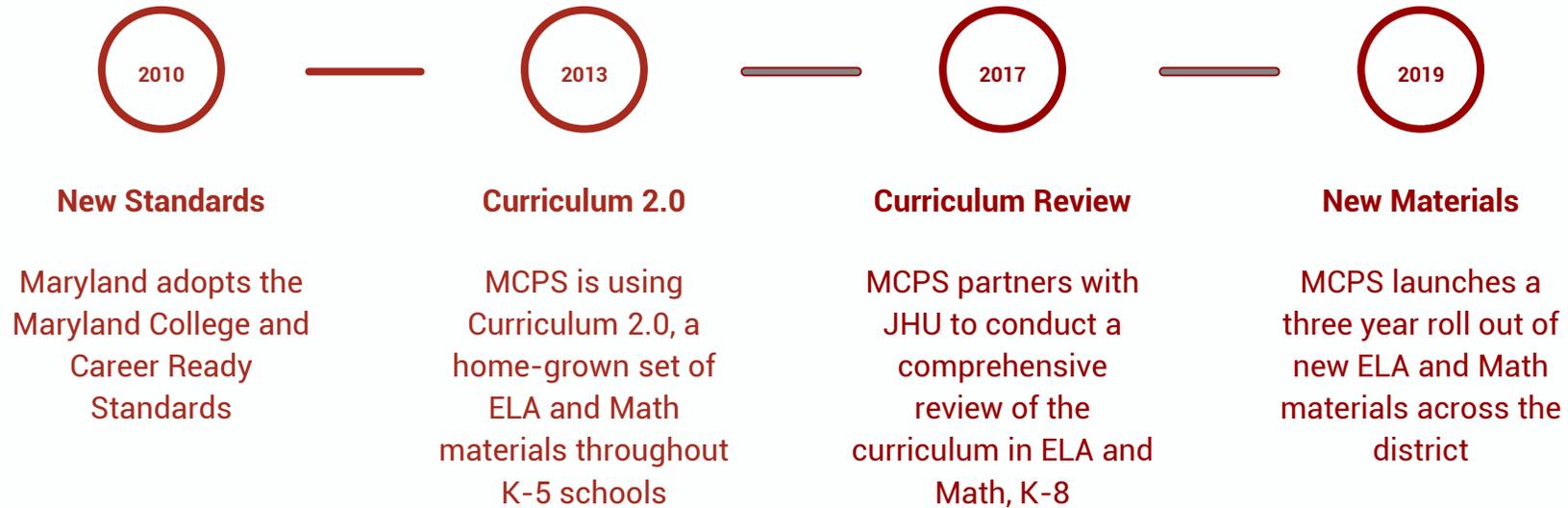
- Welcome & Introductions
- The Shifts: Curriculum 2.0 to Eureka!
- Eureka Math Lesson Components
- Tools and Strategies for Students
- Breakout Sessions
- Evaluation
- [Video](#)

Outcomes

By the end of this parent engagement session, participants will be able to;

- Articulate the rationale for the change in curriculum.
- Describe the components of a Eureka lesson.
- Name some of the learning tools.
- Work through a Eureka lesson at or near child's grade level.
- Evaluate the session.

Why did we need new materials?



The 2017 JHU Review included a 360° analysis of:

- written curriculum - the materials provided by MCPS as Curriculum 2.0 as well as the actual materials in use in classrooms.
- taught curriculum - how the curriculum is used day to day in classrooms (teacher practice)
- learned curriculum - the assignments students are given, their performance on those assignments, as well as their performance on other assessments (PARCC, etc.)

MCPS requires a curriculum to be reviewed every five years, so this review was timely!



JHU found that the materials in use were not consistently well aligned to Maryland's College and Career Ready Standards. This comports with national data (captured below).

Students
succeeded on

71%

of their
assignments

They met grade-level
standards on

17%

of those exact
same assignments

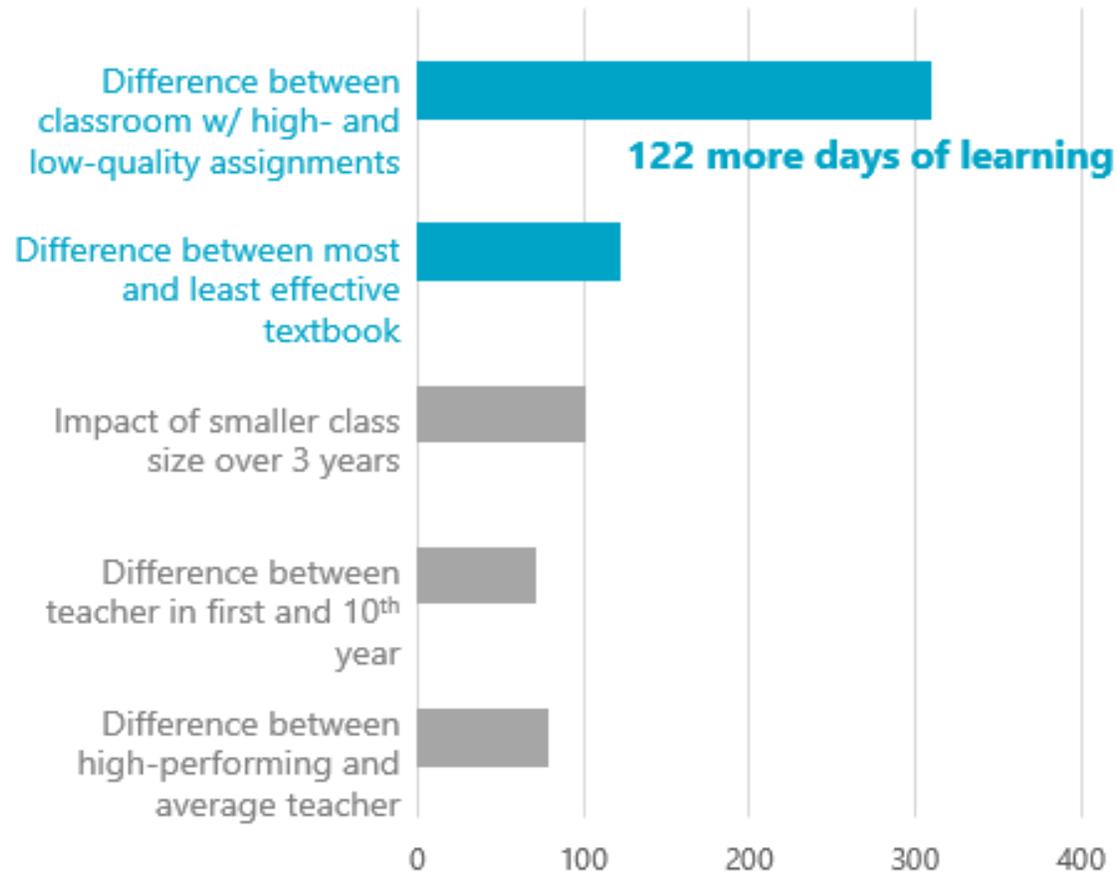
Even though most students are meeting the demands of their assignments—and many are earning As and Bs—they're not prepared for college-level work.

Curriculum is an important lever in impacting student experience and outcomes

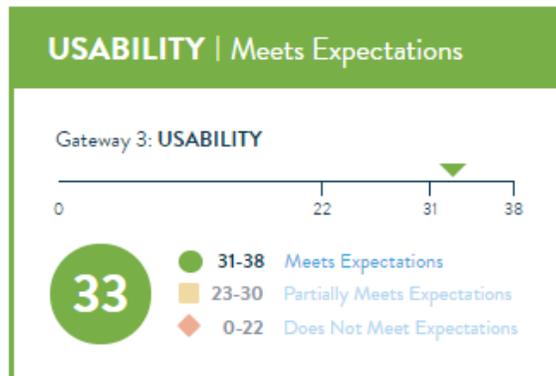
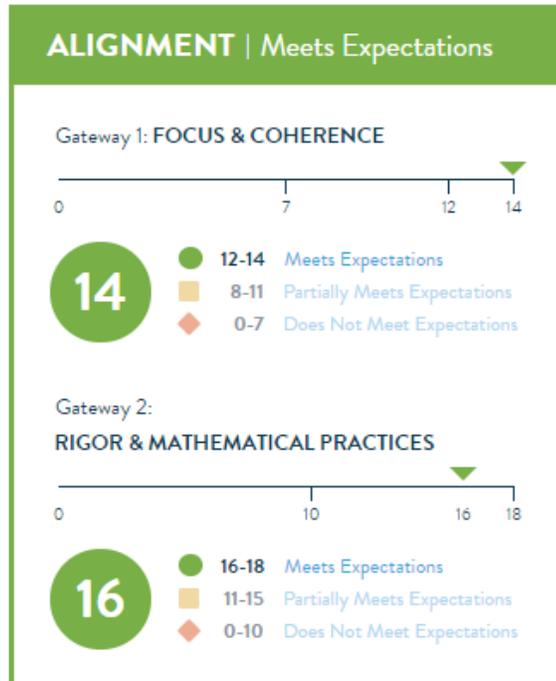
“...choice of instructional materials can have an impact as large as or **larger than the impact of teacher quality.**”

“...improving teacher quality is challenging, expensive, and time-consuming, making better choices among available instructional materials should be **relatively easy, inexpensive, and quick.**”

Effect of Instructional Materials on Student Achievement



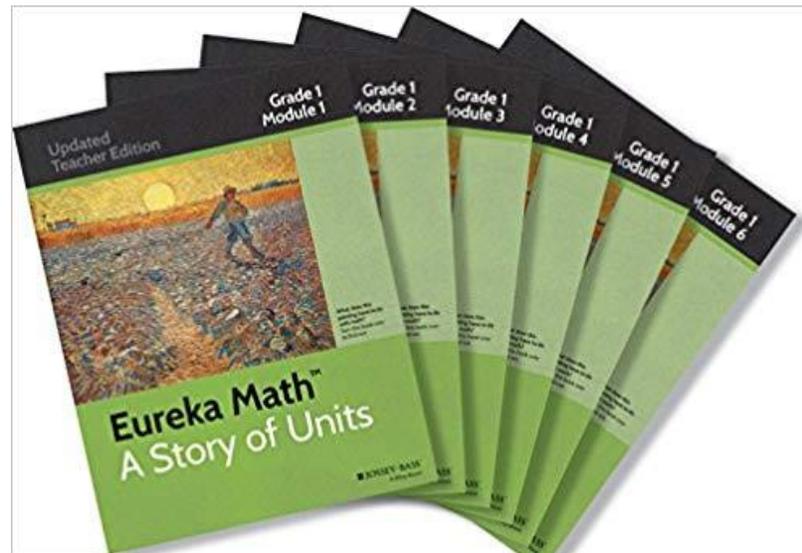
Why Eureka?



Eureka meets the three criteria for strong instructional materials according to an in depth, third party review by Ed Reports.

They received an “all green” rating on:

- focus and coherence
- rigor and mathematical practices
- usability for teachers and students



Eureka!

**EUREKA
MATH[™]**

**EUREKA
MATH[™]**



How is Eureka different? It focuses on “mathematizing.”

Answer-getting “Mathematizing”

- Math as a verb.
- “Process of modeling reality with the use of mathematical tools.”
- “Process of constructing meaning.”
- Process of applying mathematical ideas to a problem.

Counting trees

1. If Tom draws a 10x10 square round some trees and counts how many old and new there are. There are 50 rows and 50 columns altogether so he must multiply by 25. He could do this a few times to check and then take the average.

2.

53 old	x 25	=	1325 old	
28 new	x 25	=	700 new	
19 spaces	x 25	=	475 spaces	
<u>100</u>			<u>2500</u>	

$1325 + 1200 \div 2 = 1262.5$
 $700 + 875 \div 2 = 787.5$

check

48 old	x 25	=	1200 old	
35 new	x 25	=	875 new	
17 spaces	x 25	=	425 spaces	
<u>100</u>			<u>2500</u>	

So about 1263 old trees
and 788 new trees

How is Eureka different than curriculum 2.0?

It focuses on the three aspects of rigor.



Conceptual Understanding

Students build a deep understanding of the how and why of mathematics.



Procedural Skill & Fluency

Students develop efficiency and accuracy in computations.

Application

Students identify the appropriate concepts and skills to tackle novel problems and tasks.

What is EUREKA MATH?



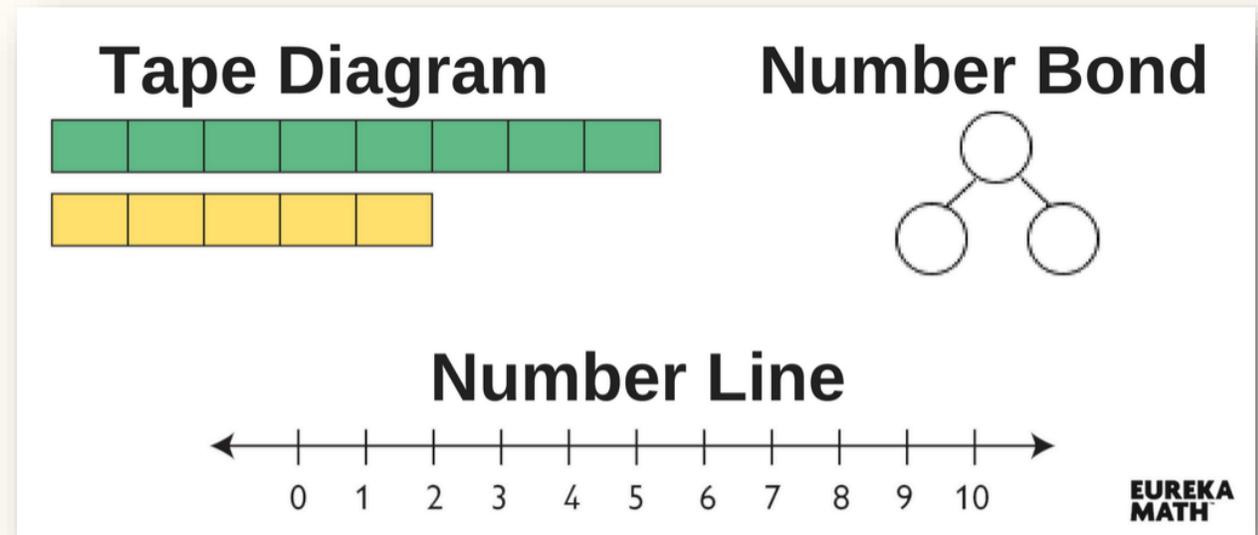
Each lesson in Eureka is comprised of four critical components. Each component serves a distinct purpose.

- Fluency practice
- Application problem
- Concept development (including the problem set)
- Student debrief (including the Exit Ticket).

Together they promote balanced and rigorous instruction and *mathematizing*.

MODELS

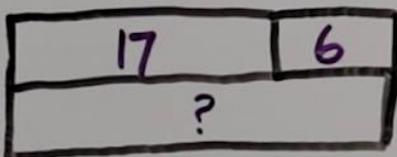
- Tools for problem solving
- Used throughout the curriculum
- Build from lesson-to-lesson, grade-to-grade



Tape Diagrams

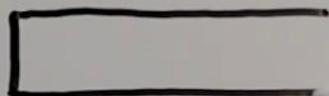
TAPE DIAGRAMS

modeling 2-digit
addition & subtraction

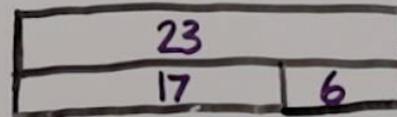


add

$$17 + 6 = \underline{23}$$



There are 23 students in
Miss Nord's class. 17 students
are present today. How many
students are absent?



subtract

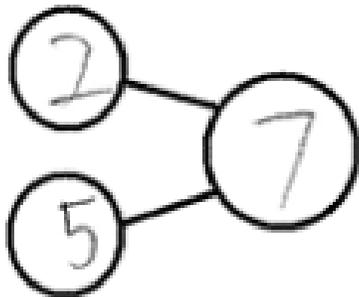
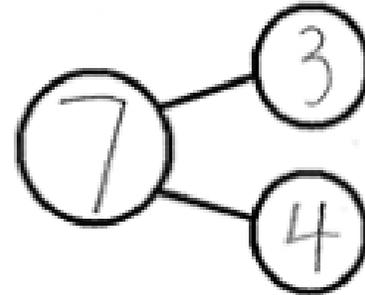
$$23 - 17 = \underline{6}$$

6 students are absent

Number Bonds -First Grade

$$\boxed{3} + \boxed{4}$$

$$\boxed{4} + \boxed{3}$$

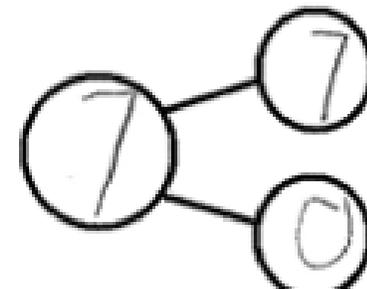


$$\boxed{2} + \boxed{5}$$

$$\boxed{5} + \boxed{2}$$

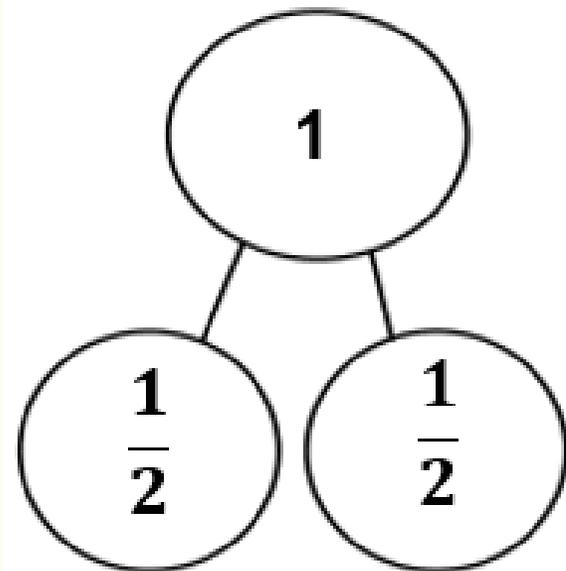
$$\boxed{7} + \boxed{0}$$

$$\boxed{0} + \boxed{7}$$

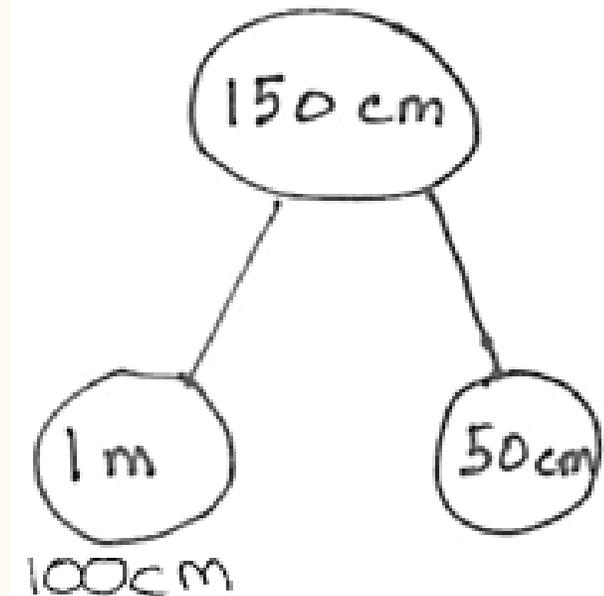


Number Bonds

- Fractions, 3rd grade



- Meters and centimeters, 4th grade



Fluency

Fluency Examples

- Finger Counting Exercises
- Whiteboard Responses
- Conversions
- Calculations
- Sprints

And More!

Application Problem

This component is included to provide students with an opportunity to apply the skills and understandings they have already learned in new ways within the framework of a real world problem.



Concept Development

This component addresses the new content being studied. The concept development is generally comprised of carefully sequenced problems centered within a specific topic to begin developing mastery via gradual increases in complexity.

It is also accompanied by an additional set of carefully crafted problems called the “problem set.” This is designed to give students a chance to practice the content just introduced on their own.

Debrief

Every lesson closes with this critical component in which the teacher engages students in a whole-group discussion, challenging them to share their thinking and draw conclusions. This allows the teacher to gauge student understanding of the concept of the lesson, offering another chance for students to gain understanding before attempting the exit ticket.

Your Turn- Experiencing Eureka Math



You're invited to engage in a math lesson at or near your child's grade level.

- **K-2 Sessions 1 and 2** will meet **in Room 35 (Mrs. Lee's 3rd grade classroom)**
- **Grades 3-5 Sessions 1 and 2** will meet in **Room 39 (Mrs. Park's 3rd grade classroom)**
- **The first session will run from 7:20-7:50.**
- **The second session is from 7:55-8:25.**

ENJOY YOUR SESSIONS!

TIPS FOR HELPING YOUR CHILD



- Have your child explain what concepts they are learning.
- Ask questions:
 - *Can you explain?*
 - *What strategy did you use?*
 - *How else can you solve it?*
- Be positive about your child's math education.
- Use *Eureka Math* Parent Resources:
 - Parent Tip Sheets
 - Homework Helpers
 - Videos

EUREKA MATH TIPS FOR PARENTS

KEY CONCEPT OVERVIEW

Welcome to Grade 8! In the first topic of Module 1, students will be learning about operations (mathematical processes such as addition and subtraction) with terms that have **exponents**. They will learn how to use definitions and properties, often referred to as the laws of exponents, to perform these operations. Students will start by investigating the properties of exponents using only positive exponents (e.g., 8^2 or $(-7)^3$), and then they will extend their knowledge to exponents of zero (e.g., 8^0) and **negative exponents** (e.g., 5^{-2} or $(-3)^{-4}$).

You can expect to see homework that asks your child to do the following:

- Write a **repeated multiplication representation** using exponents.
- Recognize when standard numbers are showing an exponential pattern. For example, 2, 4, 8, 16, and 32 are equal to 2^1 , 2^2 , 2^3 , 2^4 , and 2^5 , respectively.
- Change a given number to an **exponential expression** with a given base. For example, 25 to 5^2 .
- Determine whether an exponential expression is positive or negative.
- Simplify expressions using the properties/laws of exponents, including the **zeroth power** and negative powers.
- Explain his work, and prove that two expressions are equivalent by referencing the definition or property/law used.

SAMPLE PROBLEM (From Lesson 6)

$$(5^{-1})^4 = \left(\frac{1}{5}\right)^4$$

By definition of negative exponents

$$= \left(\frac{1}{5}\right) \times \left(\frac{1}{5}\right) \times \left(\frac{1}{5}\right) \times \left(\frac{1}{5}\right)$$

By definition of exponential notation

$$= \frac{1}{5^4}$$

By definition of negative exponents

Properties of Exponents/Laws of Exponents

For any numbers x, y and all integers a or negative integers a or nonzero a, b , the following rules apply:

Name of Rule	General Example	Another Example
1 st Law of Exponents	$x^a \cdot x^b = x^{a+b}$	$3^2 \cdot 3^3 = 3^{2+3} = 3^5$
2 nd Law of Exponents: Power to a Power	$(x^a)^b = x^{a \cdot b}$	$((-6)^2)^3 = (-6)^{2 \cdot 3} = (-6)^6$
3 rd Law of Exponents	$(x^a)^b = x^{a/b}$	$(5^2)^3 = 5^{2 \cdot 3}$
Division of Exponents: Consequence of 1 st Law for Division	$\frac{x^a}{x^b} = x^{a-b}$	$\frac{4^6}{2^4} = 4^{6-4} = 4^2$
Reciprocal to a Power: Consequence of 3 rd Law for Division	$\left(\frac{1}{x}\right)^a = \frac{1}{x^a}$	$\left(\frac{1}{3}\right)^4 = \frac{1}{3^4}$
Definition of Negative Exponents	$x^{-a} = \frac{1}{x^a}$	$5^{-2} = \frac{1}{5^2}$

Additional sample problems with detailed answer steps are found in the *Eureka Math Homework Helpers* books. Learn more at GreatMinds.org.

For more resources, visit Eureka.support

Parent Resources



- MCPS Website - Family Mathematics Support
 - <https://www.montgomeryschoolsmd.org/curriculum/math-support/elementary/grade4.aspx>
- Homework Helpers – Come with every homework assignment
- Parent Tip Sheets
 - <https://greatminds.org/resources/products/group/eureka-parent-tip-sheets>
- Curriculum 2.0 Parent Newsletters for 4/5 and 5/6 Mathematics
 - <https://www.montgomeryschoolsmd.org/curriculum/2.0/parent-newsletters.aspx>