

Orange Public Schools

Office of Curriculum & Instruction
2019-2020 Mathematics Curriculum Guide



Third Grade

Eureka – Module 1: Properties of Multiplication and Division
and Solving Problems with Units of 2-5 and 10

November 18, 2019 – January 20, 2020

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Yearlong Pacing Guide: Third Grade

<i>Eureka Math</i>	<i>Eureka Module Standards</i>
Module 1: Properties of Multiplication and Division and Solving Problems with units of 2-5 and 10 Sept 9- Oct 18	3OA1, 3OA2, 3OA3, 3OA4, 3OA5, 3OA6, 3OA7, 3OA8
Module 2: Place Value and Problem Solving with Units of Measure Oct 21- Nov 15	3NBT1 , 3NBT2, 3MD1, 3MD2
Module 3: Multiplication and Division with units of 0, 1, 6-9 and Multiples of 10 Nov 18- Jan 10	3OA3, 3OA4, 3OA5, 3OA7,3OA8, 3OA9, 3NBT3
Module 4: Multiplication and Area Jan 13- Feb 7	3.MD.5, 3.MD.6, 3.MD.7
Module 5: Fractions as numbers on the number line Feb 10- April 3	3NF1, 3NF2, 3NF3, 3G2
Module 6: Collecting/ Displaying Data April 6- May 1	3MD3, 3MD4
Module 7: Geometry and Measurement Word Problems May 4- EOSY	3OA8, 3MD4, 3MD8, 3G1

References

“Eureka Math” *Gt Minds*. 2018 < <https://greatminds.org/account/products>

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Module 1

Essential Questions	Enduring Understandings
<ul style="list-style-type: none"> • How will modeling with equal groups help us in understanding multiplication situations? • How can Properties of Operations help in performing computation as well as in problem-solving situations? • How does modeling division problems help problem solving in general? • How can the strategy of breaking apart (decomposing) numbers make multiplication easier to understand? • How can we use multiplication to solve division problems? • What are some strategies that can make multiplication and division easier to understand? 	<ul style="list-style-type: none"> • Multiplication and division are related operations. • The operations of multiplication and division are related to area. • Real world situations involving equal groups and area can be represented with multiplication and division equations and models. Repeated addition involving joining equal groups is one way to think about multiplication. • An array involves joining equal groups and is one way to think about multiplication. • Some real-world problems involving joining or separating equal groups or comparison can be solved using multiplication. • Division can be represented by fair share or equal groups situations. • Unknowns can be used in all positions when solving problems. • Multiplication and division have an inverse relationship and can be used to solve problems and check answers. • Multiplication and division problems with whole numbers can be solved by using drawings as well as equations.

Performance Overview

- Students use the language of multiplication as they understand what factors are and differentiate between the size of number and the number of factors in that number. In this module the factors 2, 3, 4, 5, and 10 provide an entry point for moving into more difficult factors in later modules.
- Topic B extends the study to division. Students understand division as an unknown factor problem, and relate the meaning of unknown factors to either the number or the size of groups. By the end of Topic B students are aware of a fundamental connection between multiplication and division that sets the foundation for the rest of the module
- In Topic C, students use the array model and familiar skip-counting strategies to solidify their understanding of multiplication. They become fluent enough with arithmetic patterns to “add” or “subtract” groups from known products to solve more complex multiplication problems. They apply their skills to word problems using drawings and equations with a symbol to find the unknown factor. This culminates in students using arrays to model the distributive property as they decompose units to multiply.
- In Topic D students model, write and solve division problems with 2 and 3. Consistent skip-counting strategies and the continued use of array models are pathways for students to naturally relate multiplication and division and solidify understanding of their relationship.
- Topic E shifts students from simple understanding to analyzing the relationship between multiplication and division. Practice of both operations is combined—this time using units of 4. Skip-counting, the distributive property, arrays, number bonds and tape diagrams are tools for both operations. Lastly, students learn that the order of numbers in a multiplication problem create equivalent expressions (eg. $3 * 4 = 4 * 3$).
- Topic F introduces the factors 5 and 10. In the final lesson of the module, students apply the tools, representations, and concepts they have learned to problem-solving with multi-step word problems using all four operations. They demonstrate the flexibility of their thinking as they assess the reasonableness of their answers for a variety of problem types.

Module 1: Properties of Multiplication and Division Solving Problems with Units 2-5 and 10

<i>Pacing:</i>		
September 9, 2019- October 18, 2019		
Suggested Instructional Days: 28		
Topic	Lesson	Lesson Objective/ Supportive Videos
Topic A: Multiplication and the Mean- ing of the Factors	Lesson 1	Understand <i>equal groups</i> of as multiplication. https://www.youtube.com/watch?v
	Lesson 2	Relate multiplication to the array model. https://www.youtube.com/watch?v
	Lesson 3	Interpret the meaning of factors – the size of the group or the number of groups. https://www.youtube.com/watch?v
Topic B: Division as an Unknown Factor Problem	Lesson 4	Understand the meaning of the unknown as the size of the group in division. https://www.youtube.com/watch?v
	Lesson 5	Understand the meaning of the unknown as the number of groups in division. https://www.youtube.com/watch?v
	Lesson 6	Interpret the unknown in division using the array model. https://www.youtube.com/watch?v
Topic C: Multiplication Using Units of 2 and 3	Lesson 7	Demonstrate the commutativity of multiplication and practice related facts by skip-counting objects in array models. https://www.youtube.com/watch?v
	Lesson 8	Demonstrate the commutativity of multiplication and practice related facts by skip-counting objects in array models. https://www.youtube.com/watch?v
	Lesson 9	Find related multiplication facts by adding and subtracting equal groups in array models. https://www.youtube.com/watch?v
	Lesson 10	Model the distributive property with arrays to decompose units as a strategy to multiply. https://www.youtube.com/watch?v

Third Grade Unit 1: Properties of Multiplication

Topic D: Division Using Units of 2 and 3	Lesson 11	Model division as the unknown factor in multiplication using arrays and tape diagrams. https://www.youtube.com/watch?v
	Lesson 12/13	Interpret the quotient as the number of groups or the number of objects in each group using units of 2 and 3. https://www.youtube.com/watch?v https://www.youtube.com/watch?v
Topic E: Multiplication and Division Us- ing Units of 4	Lesson 14	Skip-Count objects in models to build fluency with multiplication facts using units of 4. https://www.youtube.com/watch?v
	Lesson 15	Relate arrays to tape diagrams to model the commutative property of multiplication. https://www.youtube.com/watch?v
	Lesson 16	Use the distributive property as a strategy to find related multiplication facts. https://www.youtube.com/watch?v
	Lesson 17	Model the relationship between multiplication and division. https://www.youtube.com/watch?v
Topic F: Distributive Property and Problem Solving Using Units of 2– 5 and 10	Lesson 18-19	Apply the distributive property to decompose units. https://www.youtube.com/watch?v https://www.youtube.com/watch?v
	Lesson 20	Solve two-step word problems involving multiplication and division and assess the reasonableness of answers. https://www.youtube.com/watch?v
	Lesson 21	Solve two-step word problems involving all four operations and assess the reasonableness of answers. https://www.youtube.com/watch?v
End Of Module Assessment		

Modifications	
Special Education/ 504:	English Language Learners:
<ul style="list-style-type: none"> -Adhere to all modifications and health concerns stated in each IEP. -Give students a menu of options, allowing students to pick assignments from different levels based on difficulty. -Accommodate Instructional Strategies: reading aloud text, graphic organizers, one-on-one instruction, class website (Google Classroom), handouts, definition list with visuals, extended time -Allow students to demonstrate understanding of a problem by drawing the picture of the answer and then explaining the reasoning orally and/or in writing, such as Read-Draw-Write -Provide breaks between tasks, use positive reinforcement, use proximity -Assure students have experiences that are on the Concrete- Pictorial- Abstract spectrum by using manipulatives -Common Core Approach to Differentiate Instruction: Students with Disabilities (pg 17-18) - Strategies for Students with 504 Plans 	<ul style="list-style-type: none"> - Use manipulatives to promote conceptual understanding and enhance vocabulary usage - Provide graphic representations, gestures, drawings, equations, realia, and pictures during all segments of instruction - During i-Ready lessons, click on “Español” to hear specific words in Spanish - Utilize graphic organizers which are concrete, pictorial ways of constructing knowledge and organizing information - Use sentence frames and questioning strategies so that students will explain their thinking/ process of how to solve word problems - Utilize program translations (if available) for L1/ L2 students - Reword questions in simpler language - Make use of the ELL Mathematical Language Routines (click here for additional information) -Scaffolding instruction for ELL Learners -Common Core Approach to Differentiate Instruction: Students with Disabilities (pg 16-17)
Gifted and Talented:	Students at Risk for Failure:
<ul style="list-style-type: none"> - Elevated contextual complexity - Inquiry based or open ended assignments and projects - More time to study concepts with greater depth - Promote the synthesis of concepts and making real world connections - Provide students with enrichment practice that are imbedded in the curriculum such as: <ul style="list-style-type: none"> ● Application / Conceptual Development ● Are you ready for more? - Common Core Approach to Differentiate Instruction: Students with Disabilities (pg. 20) - Provide opportunities for math competitions - Alternative instruction pathways available 	<ul style="list-style-type: none"> - Assure students have experiences that are on the Concrete- Pictorial- Abstract spectrum - Modify Instructional Strategies, reading aloud text, graphic organizers, one-on-one instruction, class website (Google Classroom), inclusion of more visuals and manipulatives, Field Trips, Google Expeditions, Peer Support, one on one instruction - Assure constant parental/ guardian contact throughout the year with successes/ challenges - Provide academic contracts to students and guardians - Create an interactive notebook with samples, key vocabulary words, student goals/ objectives. - Always plan to address students at risk in your learning tasks, instructions, and directions. Try to anticipate where the needs will be and then address them prior to lessons. -Common Core Approach to Differentiate Instruction: Students with Disabilities (pg 19)

21st Century Life and Career Skills:

Career Ready Practices describe the career-ready skills that all educators in all content areas should seek to develop in their students. They are practices that have been linked to increase college, career, and life success. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study.

<https://www.state.nj.us/education/cccs/2014/career/9.pdf>

- | | |
|--|--|
| <ul style="list-style-type: none">● CRP1. Act as a responsible and contributing citizen and employee.● CRP2. Apply appropriate academic and technical skills.● CRP3. Attend to personal health and financial well-being.● CRP4. Communicate clearly and effectively and with reason.● CRP5. Consider the environmental, social and economic impacts of decisions.● CRP6. Demonstrate creativity and innovation. | <ul style="list-style-type: none">● CRP7. Employ valid and reliable research strategies.● CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.● CRP9. Model integrity, ethical leadership and effective management.● CRP10. Plan education and career paths aligned to personal goals.● CRP11. Use technology to enhance productivity.● CRP12. Work productively in teams while using cultural global competence. |
|--|--|

Students are given an opportunity to communicate with peers effectively, clearly, and with the use of technical language. They are encouraged to reason through experiences that promote critical thinking and emphasize the importance of perseverance. Students are exposed to various mediums of technology, such as digital learning, calculators, and educational websites.

Technology Standards:

All students will be prepared to meet the challenge of a dynamic global society in which they participate, contribute, achieve, and flourish through universal access to people, information, and ideas.

<https://www.state.nj.us/education/cccs/2014/tech/>

8.1 Educational Technology:

All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.

- A. **Technology Operations and Concepts:** Students demonstrate a sound understanding of technology concepts, systems and operations.
- B. **Creativity and Innovation:** Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.
- C. **Communication and Collaboration:** Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.
- D. **Digital Citizenship:** Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.
- E. **Research and Information Fluency:** Students apply digital tools to gather, evaluate, and use of information.
- F. **Critical thinking, problem solving, and decision making:** Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

8.2 Technology Education, Engineering, Design, and Computational Thinking - Programming:

All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.

- A. **The Nature of Technology: Creativity and Innovation-** Technology systems impact every aspect of the world in which we live.
- B. **Technology and Society:** Knowledge and understanding of human, cultural, and societal values are fundamental when designing technological systems and products in the global society.
- C. **Design:** The design process is a systematic approach to solving problems.
- D. **Abilities in a Technological World:** The designed world in a product of a design process that provides the means to convert resources into products and systems.
- E. **Computational Thinking: Programming-** Computational thinking builds and enhances problem solving, allowing students to move beyond using knowledge to creating knowledge.

Interdisciplinary Connections:	
English Language Arts:	
RF 3.4	Read with sufficient accuracy and fluency to support comprehension.
W.3.10	Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.
SL.3.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on <i>grade 3 topics and texts</i> , building on others' ideas and expressing their own clearly.

NJSL Standards Unpacked

3.OA.1

Interpret products of whole numbers, e.g., interpret 5×7 as the total number of objects in 5 groups of 7 objects each. *For example, describe a context in which a total number of objects can be expressed as 5×7 .*

- Students develop an initial understanding of multiplication of whole numbers by modeling situations in which there are a specific number of groups with the same number of items in each group.
- Unlike addition, in which each addend represents a certain number of items, in multiplication one factor represents the number of groups and the other factor represents the number of items in each group. The product represents the total number of items in all of the groups.
- Multiplication requires students to think in terms of groups of things rather than individual things. Students learn that the multiplication symbol ‘x’ means “groups of” and problems such as 5×7 refer to 5 groups of 7.
- To further develop this understanding, students interpret a problem situation requiring multiplication using pictures, objects, words, numbers, and equations. Then, given a multiplication, expression (e.g., 5×6) students interpret the expression using a multiplication context. They should begin to use the terms, *factor* and *product*, as they describe multiplication.

For example:

Jim purchased 5 packages of muffins. Each package contained 3 muffins. How many muffins did Jim purchase? $5 \times 3 = 15$. Describe another situation where there would be 5 groups of 3 or 5×3 . Sonya earns \$7 a week pulling weeds.

After 5 weeks of work, how much has Sonya worked? Write an equation and find the answer. Describe another situation that would match 7×5 .

3.OA.2

Interpret whole-number quotients of whole numbers, e.g., interpret $56 \div 8$ as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. *For example, describe a context in which a number of shares or a number of groups can be expressed as $56 \div 8$.*

- Division can be understood by thinking in terms of finding a missing factor (either the number of groups or the number of items in a group)
- There are two distinct meanings of division.

Partitive (Fair sharing):

Knowing the total number of items (product) and the number of groups (factor) to find the number of items in each group (missing factor).

Measurement (Repeated Subtraction):

Knowing the total number of items (product) and the number of items in each group (factor) to find the amount in each group (missing factor)

Type of Division	Number of Groups	Number of Items in group	Total number of Items
Partitive	Known	Unknown	Known
Measurement	Unknown	Known	Known

- Students should be exposed to appropriate terminology (quotient, dividend, divisor, and factor).
- To develop this understanding, students interpret a problem situation requiring division using pictures, objects, words, numbers, and equations. Given a division expression (e.g., $24 \div 6$) students interpret the expression in contexts that require both interpretations of division.

For example:

Partition models provide students with a total number and the number of groups. These models focus on the question, "How many objects are in each group so that the groups are equal?"

A context for partition models would be: There are 12 cookies on the counter. If you are sharing the cookies equally among 4 friends, how many cookies will each friend get?

<p>3.OA.3</p>	<p>Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.</p>
<ul style="list-style-type: none"> • Table 2 (below) provides problem situations for multiplication and division. These contexts provide important links to the developing conceptual understanding of the meaning of multiplication and division. • Begin with modeling equal group situations and progress to array and area situations. <u>Comparison situations do not need to be introduced until Grade 4.</u> • Students need many opportunities to use concrete materials to model the situations and identify the number of groups and the number of items in a group. • Once students demonstrate understanding with multiplication situations, use connected division examples in which students identify the total number of objects and explain whether they know the number of groups of the number of items. 	
<p>3.OA.4</p>	<p>Determine the unknown whole number in a multiplication or division equation relating three whole numbers. <i>For example, determine the unknown number that makes the equation true in each of the equations $8 \times ? = 48$, $5 = \square \div 3$, $6 \times 6 = ?$.</i></p>
<ul style="list-style-type: none"> • This standard is strongly connected to 3.OA.3 where students solve problems and determine unknowns in equations. • Students should connect their understanding of modeling and explaining division situations to symbolic notation, writing equations. • Focusing on the relationship between multiplication and division will help students develop fluency with related fact families. • Students should also experience creating story problems for given equations. When crafting story problems, they should carefully consider the question(s) to be asked and answered to write an appropriate equation. Students may approach the same story problem differently and write either a multiplication equation or division equation. 	

Third Grade Unit 1: Properties of Multiplication

- Students apply their understanding of the meaning of the equal sign as "the same as" to interpret an equation with an unknown. When given $4 \times ? = 40$, they might think:
 - 4 groups of some number is the same as 40
 - 4 times some number is the same as 40
 - I know that 4 groups of 10 is 40 so the unknown number is 10
 - The missing factor is 10 because 4 times 10 equals 40.
- Equations in the form of $a \times b = c$ and $c = a \times b$ should be used interchangeably, with the unknown in different positions.

Examples:

- Solve the equations below:
 $24 = ? \times 6$
 $72 \div \Delta = 9$
- Rachel has 3 bags. There are 4 marbles in each bag. How many marbles does Rachel have altogether? $3 \times 4 = m$

3.OA.5

Apply properties of operations as strategies to multiply and divide.² *Examples: If $6 \times 4 = 24$ is known, then $4 \times 6 = 24$ is also known. (Commutative property of multiplication.) $3 \times 5 \times 2$ can be found by $3 \times 5 = 15$, then $15 \times 2 = 30$, or by $5 \times 2 = 10$, then $3 \times 10 = 30$. (Associative property of multiplication.) Knowing that $8 \times 5 = 40$ and $8 \times 2 = 16$, one can find 8×7 as $8 \times (5 + 2) = (8 \times 5) + (8 \times 2) = 40 + 16 = 56$. (Distributive property.)*

- Properties should not be taught in isolation, but rather should be developed and discussed as part of student experiences. Incorporate opportunities for students to use the properties to develop strategies and patterns to simplify what is happening when they multiply two numbers.
- **Identity Property:** Multiplying a number by 1 does not change the number.
- **Zero Property of Multiplication:** If one of the factors is zero the product is zero.
- **Commutative Property of Multiplication:** Factors represent two different quantities- One factor represents the number of groups and the other factor represents the number of items in each group.

Although 6×3 and 3×6 have the same product, the actual multiplication situations are not the same.

- **Associative Property of Multiplication:** When multiplying three or more numbers, the product is always the same regardless of their grouping. This property is helpful in developing strategies for mental computation and decomposing factors to help students learn more difficult multiplication facts. Solving for the total number of items (the product) in “a groups with b items” ($a \times b$) and c groups of these groups is the same as thinking about “a” groups of ($b \times c$). Both ways of putting the groups of items together result in the same product because, regardless of how the groups are put together, the same number of items are being combined.
- **Distributive property of Multiplication:** Explored in the context of composing and decomposing factors. This will help students learn more difficulty basic facts.

For example, in the picture below the area of a 7×6 figure can be determined by finding the area of a 5×6 and 2×6 and adding the two sums.



3.OA.6

Understand division as an unknown-factor problem. *For example, find $32 \div 8$ by finding the number that makes 32 when multiplied by 8.*

- Multiplication and division are inverse operations and that understanding can be used to find the unknown.
- Fact family triangles demonstrate the inverse operations of multiplication and division by showing the two factors and how those factors relate to the product and/or quotient.

Example:

$$3 \times 5 = 15 \text{ \& } 5 \times 3 = 15$$

$$15 \div 3 = 5 \text{ \& } 15 \div 5 = 3$$

- Students understand that multiplication and division are inverse operations and that understanding can be used to find the unknown.
- Number Bonds demonstrate the inverse operations of multiplication and division by showing the two factors and how those factors relate to the product and/or quotient.

Examples:

$$5 \times 9 = 45 \text{ \& } 9 \times 5 = 45$$

$$45 \div 5 = 9 \text{ \& } 45 \div 9 = 5$$



Equations in the form of $a \div b = c$ and $c = a \div b$ need to be used interchangeably, with the unknown in different positions.

3.OA.7

Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that $8 \times 5 = 40$, one knows $40 \div 5 = 8$) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.

- This is a culminating standard to show the outcome of multiplication and division understanding in this domain and fluency within 100.
- By studying patterns and relationships in multiplication facts and relating multiplication and division, students build a foundation for fluency with multiplication and division facts. Students demonstrate fluency with multiplication facts through 10 and the related division facts.
- Multiplying and dividing fluently refers to knowledge of procedures, knowledge of when and how to use them appropriately, and skill in performing them flexibly, accurately, and efficiently.

Strategies students may use to attain fluency include:

- Multiplication by zero and one
- Doubles (2s facts), Doubling twice (4s), Doubling three times (8s)
- Tens facts (relating to place value, 5×10 is 5 tens or 50)
- Five facts (half of tens)
- Skip counting (counting groups of ___ and knowing how many groups have been counted)
- Square numbers (ex: 3×3)
- Nines (10 groups less one group, e.g., 9×3 is 10 groups of 3 minus one group of 3)
- Decomposing into known facts (6×7 is 6×6 plus one more group of 6)
- Turn-around facts (Commutative Property)
- Fact families (Ex: $6 \times 4 = 24$; $24 \div 6 = 4$; $24 \div 4 = 6$; $4 \times 6 = 24$)
- Missing factors

General Note: Students should have exposure to multiplication and division problems presented in both vertical and horizontal written forms.

<p>3.OA.8</p>	<p>Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.</p>	
<ul style="list-style-type: none"> • Students solve two-step problems that include more than one operation by representing the information using concrete models, pictures including bar models, and number lines. Writing equations begins with making connections between the representations and the symbolic notation (equations). • Students should be exposed to multiple problem-solving strategies (using any combination of words, numbers, diagrams, physical objects or symbols) and be able to choose which ones to use that make most sense them. <p><i>Determining whether answers are reasonable by using number sense, understanding the context, the meaning of operations using mental computation strategies, and estimation strategies cannot be overemphasized as students work with all of their ideas embedded in this Standard.</i></p> <ul style="list-style-type: none"> • Using a letter standing for the unknown quantity should explicitly connect to previous work with identifying missing information that was represented by a box, underscore, or other symbols. • When students solve word problems, they use various estimation skills which include identifying when estimation is appropriate, determining the level of accuracy needed, selecting the appropriate method of estimation, and verifying solutions or determining the reasonableness of solutions. <p>Example: On a vacation, your family travels 267 miles on the first day, 194 miles on the second day and 34 miles on the third day. How many total miles did they travel?</p>		
<p>Student 1:</p> <p>I first thought about 267 and 34. I noticed that their sum is about 300. Then I knew that 194 is close to 200. When I put 300 and 200 together, I get 500.</p>	<p>Student 2:</p> <p>I first thought about 194. It is really close to 200. I also have 2 hundreds in 267. That gives me a total of 4 hundreds. Then I have 67 in 267 and the 34. When I put 67 and 34 together that is really close to 100. When I add that hundred to the 4 hundred that I already had, I end up with 500.</p>	<p>Student 3:</p> <p>I rounded 267 to 300. I rounded 194 to 200. I rounded 34 to 30. When I added 300, 200, and 30. I know my answer be about 500.</p>

Third Grade Unit 1: Properties of Multiplication

Common multiplication and division situations.¹

	UNKNOWN PRODUCT	GROUP SIZE UNKNOWN ("HOW MANY IN EACH GROUP?" DIVISION)	NUMBER OF GROUPS UNKNOWN ("HOW MANY GROUPS?" DIVISION)
	$3 \times 6 = ?$	$3 \times ? = 18$, and $18 \div 3 = ?$	$? \times 6 = 18$, and $18 \div 6 = ?$
EQUAL GROUPS	There are 3 bags with 6 plums in each bag. How many plums are there in all? <i>Measurement example.</i> You need 3 lengths of string, each 6 inches long. How much string will you need altogether?	If 18 plums are shared equally into 3 bags, then how many plums will be in each bag? <i>Measurement example.</i> You have 18 inches of string, which you will cut into 3 equal pieces. How long will each piece of string be?	If 18 plums are to be packed 6 to a bag, then how many bags are needed? <i>Measurement example.</i> You have 18 inches of string, which you will cut into pieces that are 6 inches long. How many pieces of string will you have?
ARRAYS², AREA³	There are 3 rows of apples with 6 apples in each row. How many apples are there? <i>Area example.</i> What is the area of a 3 cm by 6 cm rectangle?	If 18 apples are arranged into 3 equal rows, how many apples will be in each row? <i>Area example.</i> A rectangle has area 18 square centimeters. If one side is 3 cm long, how long is a side next to it?	If 18 apples are arranged into equal rows of 6 apples, how many rows will there be? <i>Area example.</i> A rectangle has area 18 square centimeters. If one side is 6 cm long, how long is a side next to it?
COMPARE	A blue hat costs \$6. A red hat costs 3 times as much as the blue hat. How much does the red hat cost? <i>Measurement example.</i> A rubber band is 6 cm long. How long will the rubber band be when it is stretched to be 3 times as long?	A red hat costs \$18 and that is 3 times as much as a blue hat costs. How much does a blue hat cost? <i>Measurement example.</i> A rubber band is stretched to be 18 cm long and that is 3 times as long as it was at first. How long was the rubber band at first?	A red hat costs \$18 and a blue hat costs \$6. How many times as much does the red hat cost as the blue hat? <i>Measurement example.</i> A rubber band was 6 cm long at first. Now it is stretched to be 18 cm long. How many times as long is the rubber band now as it was at first?
GENERAL	$a \times b = ?$	$a \times ? = p$ and $p \div a = ?$	$? \times b = p$, and $p \div b = ?$

¹ The language in the array examples shows the easiest form of array problems. A harder form is to use the terms rows and columns: The apples in the grocery window are in 3 rows and 6 columns. How many apples are in there? Both forms are valuable.

² Area involves arrays of squares that have been pushed together so that there are no gaps or overlaps, so array problems include these especially important measurement situations.

³ The first examples in each cell are examples of discrete things. These are easier for students and should be given before the measurement examples.

Module 1 Assessment Framework			
Assessment	NJSLS	Estimated Time	Format
Diagnostic Assessment 1 (iReady)		1-2 blocks	Individual
Optional Mid –Module Assessment (Interview Style)	3.OA.1-8	1 Block	Individual or Small Group with Teacher
Optional End-of- Module Assessment (Interview Style)	3.OA.1-8	1 Block	Individual or Small Group with Teacher

Module 1 Performance Assessment/ PBL Framework			
Assessment	NJSLS	Estimated Time	Format
Module 1 Performance Task 1 <i>Cookie Dough</i>	3.OA.7	Up to 30 minutes	Individual or Small Group
Extended Constructed Response (ECR)* (click here for access)	Dependent on unit of study & month of administration	Up to 30 Minutes	Individual

Use the following links to access ECR protocol and district assessment scoring documents:

- [Assessment and Data in Mathematics Bulletin](#)
- [ECR Protocol](#)

Third Grade Ideal Math Block

Fluency: Whole Group
Sprints, Counting, Whiteboard Exchange

Application Problem: Whole Group
Provides HANDS-ON work to allow children to ACT OUT or ENGAGE ACTIVELY with the new MATH IDEA
Technology Integration: <https://embarc.online/>
*Website provides Goggle slides, additional activities, and student videos per lesson

Concept Development: Individual/partner/whole
Instruction & Strategic Problem Set Questions
Technology Integration: <https://embarc.online/>
Website provides Goggle slides, additional activities, and student videos. per lesson

Student Debrief: Whole Group
Exit Ticket: Independent

CENTERS/STATIONS:
Pairs / Small Group/ Individual
DIFFERENTIATED activities designed to RETEACH, REMEDIATE, ENRICH student's understanding of concepts.

M: Meet with the teacher https://teacher-toolbox.com/	A: Application/ Problem Solving	T: Technology Resources I-ready Zearn	H: Hands on Activities
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50-60 min.

20-30 min.

Lesson Structure:

Fluency:

- Sprints
- Whiteboard Exchange

Technology Integration:

Splat Sequences

[Which one doesn't belong?](#)

[Would you rather?](#)

Esti- Mysteries

Anchor Task:

- Engage students in using the RDW Process
- Sequence problems from simple to complex and adjust based on students' responses
- Facilitate share and critique of various explanations, representations, and/or examples.

Guided Practice/ Independent Practice : (largest chunk of time)

Instruction:

- Maintain overall alignment with the objectives and suggested pacing and structure.
- Use of tools, precise mathematical language, and/or models
- Balance teacher talk with opportunities for peer share and/or collaboration
- Generate next steps by watching and listening for understanding

Problem Set: (Individual, partner, or group)

- Allow for independent practice and productive struggle
- Assign problems strategically to differentiate practice as needed
- Create and assign remedial sequences as needed

Technology Integration:

Think Central:

- Pre-Test
- Chapter Review
- Test Prep
- Performance Tasks

<https://embarc.online/>

[Virtual Manipulatives](#) for lessons

<http://nlvm.usu.edu/en/nav/vlibrary.html>

For videos that students can watch and interact with independently click [here](#)

Student Debrief:

- Elicit students thinking, prompt reflection, and promote metacognition through student centered discussion
- Culminate with students' verbal articulation of their learning for the day
- Close with completion of the daily Exit Ticket (opportunity for informal assessment that guides effective preparation of subsequent lessons) as needed.

Centers:

- I-Ready: <https://login.i-ready.com/> *i-Ready* makes the promise of differentiated instruction a practical reality for teachers and students. It was designed to get students excited about learning and to support teachers in the challenge of meeting the needs of all learners. Through the power of one intuitive system whose pieces were built from the ground up to work together, teachers have the tools they need to ensure students are on the road to proficiency.
- Zearn: <https://www.zearn.org/> *Zearn* Math is a K-5 math curriculum based on Eureka Math with top-rated materials for teacher-led and digital instruction.
- Teacher Toolbox; <https://teacher-toolbox.com/> A digital collection of K-8 resources to help you differentiate instruction to students performing on, below, and above grade level.

NJSLA Assessment Evidence/Clarification Statements			
NJSLS	Evidence Statement	Clarification	MP
3.OA.1	Interpret products of whole numbers, e.g., interpret 5×7 as the total number of objects in 5 groups of 7 objects each. For example, describe a context in which a total number of objects can be expressed as 5×7 .	<ul style="list-style-type: none"> • Tasks involve interpreting rather than calculating products in terms of equal groups, arrays, area, and/or measurement quantities. (See CCSSM, Table 2, Common multiplication and division situations, p. 89.) For example, “the total number of books if 5 shelves each have 7 books” can be represented by the expression 5×7 rather than “Marcie placed 7 books on each of 5 shelves. How many books does she have?” • Tasks do not require students to interpret products in terms of repeated addition, skip counting, or jumps on the number line. • The italicized example refers to describing a real-world context, but describing a context is not the only way to meet the standard. For example, another way to meet the standard would be to identify contexts in which a total can be expressed as a specified product. 	MP 2,4
3.OA.2	Interpret whole-number quotients of whole numbers, e.g., interpret $56 \div 8$ as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. For example, describe a context in which a number of shares or a number of groups can be expressed as $56 \div 8$.	<ul style="list-style-type: none"> • Tasks involve interpreting rather than calculating quotients in terms of equal groups, arrays, area, and/or measurement quantities. (See CCSSM, Table 2, Common multiplication and division situations, p. 89.) For example, “35 books are placed equally on 7 shelves” can be represented by the expression $35 \div 7$ rather than “Marcie has 35 books. She placed the same number on each of 7 shelves. How many books did she place on each shelf?” • Tasks do not require students to interpret quotients in terms of repeated subtraction, skip-counting, or jumps on the number line. • The italicized example refers to describing a real-world context, but describing a context is not the only way to meet the standard. For example, another way to meet the standard would be to identify contexts in which a number of objects can be expressed as a specified quotient. • Half the tasks require interpreting quotients as a number of objects in each share and half require interpreting quotients as a number of equal shares. 	MP 2,4

Third Grade Unit 1: Properties of Multiplication

3.OA.3-1	Use multiplication within 100 (both factors less than or equal to 10) to solve word problems in situations involving equal groups, arrays, or area, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.	<ul style="list-style-type: none"> • All products come from the harder three quadrants of the times table ($a \times b$ where $a > 5$ and/or $b > 5$). • 75% of tasks involve multiplying to find the total number (equal groups, arrays); 25% involve multiplying to find the area. • For more information see CCSS Table 2, Common multiplication and division situations, p. 89 and the OA Progression. 	MP 1,4
3.OA.3-2	Use multiplication within 100 (both factors less than or equal to 10) to solve word problems in situations involving measurement quantities other than area, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.	<ul style="list-style-type: none"> • All products come from the harder three quadrants of the times table ($a \times b$ where $a > 5$ and/or $b > 5$). • Tasks involve multiplying to find a total measure (other than area). • For more information see CCSS Table 2, Common multiplication and division situations, p. 89 and the OA Progression. 	MP 1,4
3.OA.3-3	Use division within 100 (quotients related to products having both factors less than or equal to 10) to solve word problems in situations involving equal groups, arrays, or area, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.	<ul style="list-style-type: none"> • All quotients are related to products from the harder three quadrants of the times table ($a \times b$ where $a > 5$ and/or $b > 5$). • Tasks using this Evidence Statement will be created equally among the following: <ul style="list-style-type: none"> • dividing to find the number in each equal group or in each equal row/column of an array; • dividing to find the number of equal groups or the number of equal rows/columns of an array; and • dividing an area by a side length to find an unknown side length. • For more information see CCSS Table 2, Common multiplication and division situations p. 89 and the OA Progression. 	MP 1,4
3.OA.3-4	Use division within 100 (quotients related to products having both factors less than or equal to 10) to solve word problems in situations involving measurement quantities other than area, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem	<ul style="list-style-type: none"> • All quotients are related to products from the harder three quadrants of the times table ($a \times b$ where $a > 5$ and/or $b > 5$). • Half the tasks involve finding the number of equal pieces and half involve finding the measure of each piece. • For more information see CCSS Table 2, Common multiplication and division situations, p. 89 and the OA Progression. 	MP 1,4

Third Grade Unit 1: Properties of Multiplication

3.OA.4	Determine the unknown whole number in a multiplication or division equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations $8 \times ? = 48$, $5 = \heartsuit \div 3$, $6 \times 6 = ?$.	<ul style="list-style-type: none"> • Tasks do not have a context. • Only the answer is required. • All products and related quotients are from the harder three quadrants of the times table ($a \times b$ where $a > 5$ and/or $b > 5$). 	
3.OA.6	Understand division as an unknown-factor problem. For example, find $32 \div 8$ by finding the number that makes 32 when multiplied by 8	<ul style="list-style-type: none"> • All products and related quotients are from the harder three quadrants of the times table ($a \times b$ where $a > 5$ and/or $b > 5$). 	
3.OA.7-1	Fluently multiply and divide within 25. By end of grade 3, know from memory all products of two one-digit numbers.	<ul style="list-style-type: none"> • Tasks do not have a context. • Only the answer is required. • Tasks require finding products and related quotients accurately. For example, each 1-point task might require four or more computations, two or more multiplication and two or more division. • Tasks are not timed. 	
3.OA.7-2	Fluently multiply and divide within 100. By the end of Grade 3, know from memory all products of two one-digit numbers.	<ul style="list-style-type: none"> • Tasks do not have a context. • Only the answer is required. • Tasks require finding of products and related quotients accurately. For example, each 1-point task might require four or more computations, two or more multiplication and two or more division. • 75% of tasks are from the harder three quadrants of the times table ($a \times b$ where $a > 5$ and/or $b > 5$). • Tasks are not timed. 	
3.OA.8	Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.	<ul style="list-style-type: none"> • Tasks do not require a student to write a single equation with a letter standing for the unknown quantity in a two-step problem, and then solve that equation. • Tasks may require students to write an equation as part of their work to find a solution, but students are not required to use a letter for the unknown. • Addition, subtraction, multiplication and division situations in these problems may involve any of the basic situation types with unknowns in various positions 	MP 1,4

Third Grade Unit 1: Properties of Multiplication

Number Talks

What does Number Talks look like?

- Students are near each other so they can communicate with each other (central meeting place)
- Students are mentally solving problems
- Students are given thinking time
- Thumbs up show when they are ready
- Teacher is recording students' thinking

Communication

- Having to talk out loud about a problem helps students clarify their own thinking
- Allow students to listen to other's strategies and value other's thinking
- Gives the teacher the opportunity to hear student's thinking

Mental Math

- When you are solving a problem mentally you must rely on what you know and understand about the numbers instead of memorized procedures
- You must be efficient when computing mentally because you can hold a lot of quantities in your head

Thumbs Up

- This is just a signal to let you know that you have given your students enough time to think about the problem
- It will give you a picture of who is able to compute mentally and who is struggling
- It isn't as distracting as a waving hand

Teacher as Recorder

- Allows you to record students' thinking in the correct notation
- Provides a visual to look at and refer back to
- Allows you to keep a record of the problems posed and which students offered specific strategies

Purposeful Problems

- Start with small numbers so the students can learn to focus on the strategies instead of getting lost in the numbers
- Use a number string (a string of problems that are related to and scaffold each other)

Starting Number Talks in your Classroom

- Start with specific problems in mind
- Be prepared to offer a strategy from a previous student
- It is ok to put a student's strategy on the backburner
- Limit your number talks to about 15 minutes
- Ask a question, don't tell!

The teacher asks questions:

- Who would like to share their thinking?
- Who did it another way?
- How many people solved it the same way as Billy?
- Does anyone have any questions for Billy?
- Billy, can you tell us where you got that 5?

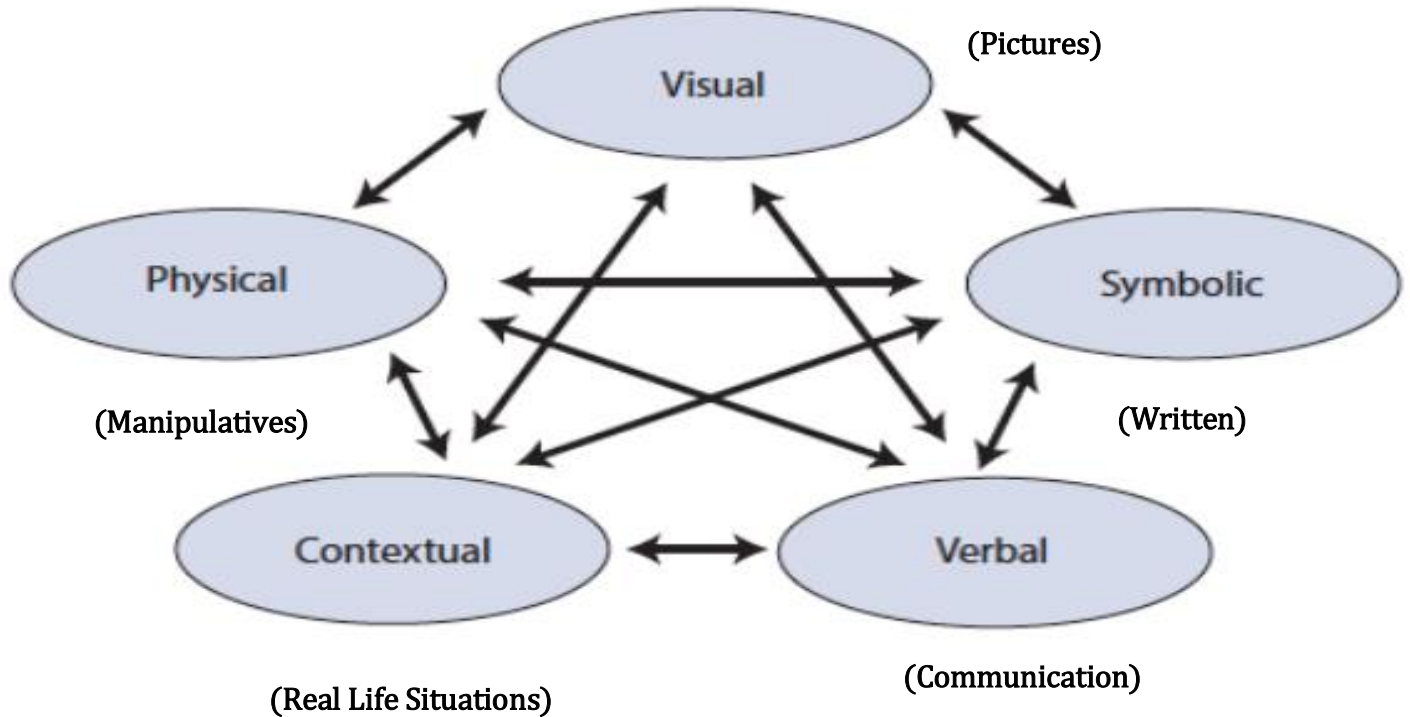
Third Grade Unit 1: Properties of Multiplication

Student Name: _____ Task: _____ School: _____ Teacher: _____

Date: _____

"I CAN...."	STUDENT FRIENDLY RUBRIC				SCORE
	...a start 1	...getting there 2	...that's it 3	WOW! 4	
Understand	I need help.	I need some help.	I do not need help.	I can help a class-mate.	
Solve	I am unable to use a strategy.	I can start to use a strategy.	I can solve it more than one way.	I can use more than one strategy and talk about how they get to the same answer.	
Say or Write	I am unable to say or write.	I can write or say some of what I did.	I can write and talk about what I did. I can write or talk about why I did it.	I can write and say what I did and why I did it.	
Draw or Show	I am not able to draw or show my thinking.	I can draw, but not show my thinking; or I can show but not draw my thinking;	I can draw and show my thinking	I can draw, show and talk about my thinking.	

Use and Connection of Mathematical Representations



The Lesh Translation Model

Each oval in the model corresponds to one way to represent a mathematical idea.

Visual: When children draw pictures, the teacher can learn more about what they understand about a particular mathematical idea and can use the different pictures that children create to provoke a discussion about mathematical ideas. Constructing their own pictures can be a powerful learning experience for children because they must consider several aspects of mathematical ideas that are often assumed when pictures are pre-drawn for students.

Physical: The manipulatives representation refers to the unifix cubes, base-ten blocks, fraction circles, and the like, that a child might use to solve a problem. Because children can physically manipulate these objects, when used appropriately, they provide opportunities to compare relative sizes of objects, to identify patterns, as well as to put together representations of numbers in multiple ways.

Verbal: Traditionally, teachers often used the spoken language of mathematics but rarely gave students opportunities to grapple with it. Yet, when students do have opportunities to express their mathematical reasoning aloud, they may be able to make explicit some knowledge that was previously implicit for them.

Symbolic: Written symbols refer to both the mathematical symbols and the written words that are associated with them. For students, written symbols tend to be more abstract than the other representations. I tend to introduce symbols after students have had opportunities to make connections among the other representations, so that the students have multiple ways to connect the symbols to mathematical ideas, thus increasing the likelihood that the symbols will be comprehensible to students.

Contextual: A relevant situation can be any context that involves appropriate mathematical ideas and holds interest for children; it is often, but not necessarily, connected to a real-life situation.

The Lesh Translation Model: Importance of Connections

As important as the ovals are in this model, another feature of the model is even more important than the representations themselves: The arrows! The arrows are important because they represent the connections students make between the representations. When students make these connections, they may be better able to access information about a mathematical idea, because they have multiple ways to represent it and, thus, many points of access.

Individuals enhance or modify their knowledge by building on what they already know, so the greater the number of representations with which students have opportunities to engage, the more likely the teacher is to tap into a student's prior knowledge. This "tapping in" can then be used to connect students' experiences to those representations that are more abstract in nature (such as written symbols). Not all students have the same set of prior experiences and knowledge. Teachers can introduce multiple representations in a meaningful way so that students' opportunities to grapple with mathematical ideas are greater than if their teachers used only one or two representations.

Concrete Pictorial Abstract (CPA) Instructional Approach

The CPA approach suggests that there are three steps necessary for pupils to develop understanding of a mathematical concept.

Concrete: “Doing Stage”: Physical manipulation of objects to solve math problems.

Pictorial: “Seeing Stage”: Use of imaged to represent objects when solving math problems.

Abstract: “Symbolic Stage”: Use of only numbers and symbols to solve math problems.

CPA is a gradual systematic approach. Each stage builds on to the previous stage. Reinforcement of concepts are achieved by going back and forth between these representations and making connections between stages. Students will benefit from seeing parallel samples of each stage and how they transition from one to another.

Read, Draw, Write Process

READ the problem. Read it over and over.... And then read it again.

DRAW a picture that represents the information given. During this step students ask themselves: Can I draw something from this information? What can I draw? What is the best model to show the information? What conclusions can I make from the drawing?

WRITE your conclusions based on the drawings. This can be in the form of a number sentence, an equation, or a statement.

Students are able to draw a model of what they are reading to help them understand the problem. Drawing a model helps students see which operation or operations are needed, what patterns might arise, and which models work and do not work. Students must dive deeper into the problem by drawing models and determining which models are appropriate for the situation.

While students are employing the RDW process they are using several Standards for Mathematical Practice and in some cases, all of them.

Mathematical Discourse and Strategic Questioning

Discourse involves asking strategic questions that elicit from students their understanding of the context and actions taking place in a problem, how a problem is solved and why a particular method was chosen. Students learn to critique their own and others' ideas and seek out efficient mathematical solutions.

While classroom discussions are nothing new, the theory behind classroom discourse stems from constructivist views of learning where knowledge is created internally through interaction with the environment. It also fits in with socio-cultural views on learning where students working together are able to reach new understandings that could not be achieved if they were working alone.

Underlying the use of discourse in the mathematics classroom is the idea that mathematics is primarily about reasoning not memorization. Mathematics is not about remembering and applying a set of procedures but about developing understanding and explaining the processes used to arrive at solutions.

Teacher Questioning:

Asking better questions can open new doors for students, promoting mathematical thinking and classroom discourse. Can the questions you're asking in the mathematics classroom be answered with a simple “yes” or “no,” or do they invite students to deepen their understanding?



The most
important thing
is to NEVER
stop
questioning

Albert Einstein

To help you encourage deeper discussions, here are 100 questions to incorporate into your instruction by Gladis Kersaint, mathematics expert and advisor for Ready Mathematics.

Dr.

100 questions that promote

Mathematical Discourse

Help students **work together** to make sense of mathematics

- 1 What **strategy** did you use?
- 2 Do you **agree**?
- 3 Do you **disagree**?
- 4 Would you **ask the rest of the class** that question?
- 5 Could you **share your method** with the class?
- 6 What part of what he said **do you understand**?
- 7 Would someone like to **share** ___?
- 8 Can you **convince the rest of us** that your answer makes sense?
- 9 **What do others think** about what [student] said?
- 10 Can someone **retell or restate** [student]'s explanation?
- 11 Did you **work together**? In what way?
- 12 Would anyone like to **add to what was said**?
- 13 Have you **discussed** this with your group? With others?
- 14 Did anyone get a **different answer**?
- 15 **Where** would you go for **help**?
- 16 **Did everybody get a fair chance** to talk, use the manipulatives, or be the recorder?
- 17 How could you help another student **without telling them the answer**?
- 18 **How would you explain** ___ to someone who missed class today?

Help students **rely more on themselves** to determine whether something is **mathematically correct**

- 19 Is this a **reasonable answer**?
- 20 Does that make **sense**?
- 21 **Why** do you think that? Why is that true?
- 22 Can you **draw a picture or make a model** to show that?
- 23 **How** did you reach that conclusion?
- 24 Does anyone want to **revise** his or her answer?
- 25 **How were you sure** your answer was right?

Ready

Help students learn to reason mathematically

- 26 How did you **begin** to think about this problem?
- 27 What is **another way** you could solve this problem?
- 28 How could you **prove** _____?
- 29 Can you **explain how your answer is different from or the same as** [student]'s answer?
- 30 Let's **break the problem into parts**. What would the parts be?
- 31 Can you **explain this part more specifically**?
- 32 Does that **always work**?
- 33 Can you think of a case where that **wouldn't work**?
- 34 How did you **organize** your information? Your thinking?

Help students with problem comprehension

- 39 What is this problem about? What can you **tell me about it**?
- 40 Do you need to **define or set limits** for the problem?
- 41 How would you **interpret** that?
- 42 Could you **reword that in simpler terms**?
- 43 Is there something that can be **eliminated** or that is **missing**?
- 44 Could you **explain** what the problem is asking?
- 45 What **assumptions** do you have to make?
- 46 What do you **know** about this part?
- 47 Which words were **most important**? Why?

Help students evaluate their own processes and engage in productive peer interaction

- 35 What do you need to do **next**?
- 36 What have you **accomplished**?
- 37 What are your **strengths and weaknesses**?
- 38 Was your **group participation appropriate and helpful**?



Help students learn to **conjecture, invent, and solve** problems

- 48 **What would happen if ___?**
- 49 Do you see a **pattern**?
- 50 What are some **possibilities** here?
- 51 Where could you find the **information** you need?
- 52 How would you **check your steps** or your answer?
- 53 What **did not work**?
- 54 How is your solution method the **same as or different from** [student]'s method?
- 55 Other than retracing your steps, **how can you determine** if your answers are appropriate?
- 56 How did you **organize** the information? Do you have a **record**?
- 57 How could you solve this using **tables, lists, pictures, diagrams**, etc.?
- 58 What have you tried? What **steps** did you take?
- 59 How would it look if you used this **model** or these **materials**?
- 60 How would you draw a **diagram** or **make a sketch** to solve the problem?
- 61 Is there **another possible answer**? If so, explain.
- 62 Is there **another way to solve** the problem?
- 63 Is there **another model** you could use to solve the problem?
- 64 Is there anything you've **overlooked**?
- 65 **How did you think** about the problem?
- 66 What was your **estimate or prediction**?
- 67 How **confident** are you in your answer?
- 68 **What else** would you like to know?
- 69 What do you think comes **next**?
- 70 Is the solution **reasonable**, considering the context?
- 71 Did you have a **system**? Explain it.
- 72 Did you have a **strategy**? Explain it.
- 73 Did you have a **design**? Explain it.



Help students learn to **connect mathematics, its ideas, and its application**

- 74 What is the **relationship** between ___ and ___?
- 75 Have we ever solved a problem **like this before**?
- 76 What uses of mathematics did you find in the **newspaper** last night?
- 77 What is the **same**?
- 78 What is **different**?
- 79 Did you use skills or build on concepts that were **not necessarily mathematical**?
- 80 Which **skills or concepts** did you use?
- 81 What **ideas** have we explored before that were useful in solving this problem?
- 82 Is there a **pattern**?
- 83 **Where else** would this strategy be useful?
- 84 How does this **relate** to ___?
- 85 Is there a **general rule**?
- 86 Is there a **real-life situation** where this could be used?
- 87 How would your method work with **other problems**?
- 88 What other problem does this seem to **lead to**?

Help students **persevere**

- 89 Have you tried making a **guess**?
 - 90 **What else** have you tried?
 - 91 Would **another method** work as well or better?
 - 92 Is there **another way** to draw, explain, or say that?
 - 93 Give me another **related problem**. Is there an easier problem?
 - 94 How would you **explain** what you know right now?
- 95 What was **one thing you learned** (or two, or more)?
 - 96 Did you **notice any patterns**? If so, describe them.
 - 97 What **mathematics topics** were used in this investigation?
 - 98 What were the **mathematical ideas** in this problem?
 - 99 What is mathematically **different about these two situations**?
 - 100 What are the **variables** in this problem? What stays **constant**?

Help students **focus on the mathematics from activities**

Conceptual Understanding

Students demonstrate conceptual understanding in mathematics when they provide evidence that they can:

- recognize, label, and generate examples of concepts;
- use and interrelate models, diagrams, manipulatives, and varied representations of concepts;
- identify and apply principles; know and apply facts and definitions;
- compare, contrast, and integrate related concepts and principles; and
- recognize, interpret, and apply the signs, symbols, and terms used to represent concepts.

Conceptual understanding reflects a student's ability to reason in settings involving the careful application of concept definitions, relations, or representations of either.

Procedural Fluency

Procedural fluency is the ability to:

- apply procedures accurately, efficiently, and flexibly;
- to transfer procedures to different problems and contexts;
- to build or modify procedures from other procedures; and
- to recognize when one strategy or procedure is more appropriate to apply than another.

Procedural fluency is more than memorizing facts or procedures, and it is more than understanding and being able to use one procedure for a given situation. Procedural fluency builds on a foundation of conceptual understanding, strategic reasoning, and problem solving (NGA Center & CCSSO, 2010; NCTM, 2000, 2014). Research suggests that once students have memorized and practiced procedures that they do not understand, they have less motivation to understand their meaning or the reasoning behind them (Hiebert, 1999). Therefore, the development of students' conceptual understanding of procedures should precede and coincide with instruction on procedures.

Math Fact Fluency: Automaticity

Students who possess math fact fluency can recall math facts with automaticity. Automaticity is the ability to do things without occupying the mind with the low-level details required, allowing it to become an automatic response pattern or habit. It is usually the result of learning, repetition, and practice.

3-5 Math Fact Fluency Expectation

3.OA.C.7: Single-digit products and quotients (Products from memory by end of Grade 3)

3.NBT.A.2: Add/subtract within 1000

4.NBT.B.4: Add/subtract within 1,000,000/ Use of Standard Algorithm

5.NBT.B.5: Multi-digit multiplication/ Use of Standard Algorithm

Evidence of Student Thinking

Effective classroom instruction and more importantly, improving student performance, can be accomplished when educators know how to elicit evidence of students' understanding on a daily basis. Informal and formal methods of collecting evidence of student understanding enable educators to make positive instructional changes. An educators' ability to understand the processes that students use helps them to adapt instruction allowing for student exposure to a multitude of instructional approaches, resulting in higher achievement. By highlighting student thinking and misconceptions, and eliciting information from more students, all teachers can collect more representative evidence and can therefore better plan instruction based on the current understanding of the entire class.

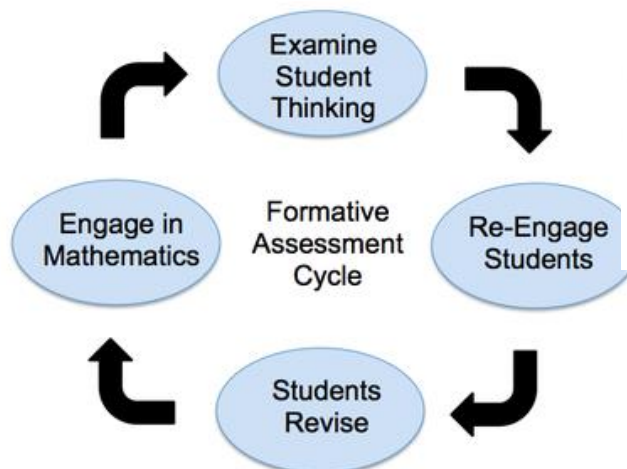
Mathematical Proficiency

To be mathematically proficient, a student must have:

- Conceptual understanding: comprehension of mathematical concepts, operations, and relations;
- Procedural fluency: skill in carrying out procedures flexibly, accurately, efficiently, and appropriately;
- Strategic competence: ability to formulate, represent, and solve mathematical problems;
- Adaptive reasoning: capacity for logical thought, reflection, explanation, and justification;
- Productive disposition: habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one's own efficacy.

Evidence should:

- Provide a window in student thinking;
- Help teachers to determine the extent to which students are reaching the math learning goals; and
- Be used to make instructional decisions during the lesson and to prepare for subsequent lessons.



Formative assessment is an essentially interactive process, in which the teacher can find out whether what has been taught has been learned, and if not, to do something about it. Day-to-day formative assessment is one of the most powerful ways of improving learning in the mathematics classroom.

(William 2007, pp. 1054; 1091)

Connections to the Mathematical Practices

Student Friendly Connections to the Mathematical Practices

1. I can solve problems without giving up.
2. I can think about numbers in many ways.
3. I can explain my thinking and try to understand others.
4. I can show my work in many ways.
5. I can use math tools and tell why I choose them.
6. I can work carefully and check my work.
7. I can use what I know to solve new problems.
8. I can discover and use short cuts.

The Standards for Mathematical Practice:

Describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

1	<p>Make sense of problems and persevere in solving them</p> <p>Mathematically proficient students in grade 4 know that doing mathematics involves solving problems and discussing how they solved them. Students explain to themselves the meaning of a problem and look for ways to solve it. Fourth graders may use concrete objects or pictures to help them conceptualize and solve problems. They may check their thinking by asking themselves, “Does this make sense?” They listen to the strategies of others and will try different approaches. They often will use another method to check their answers.</p>
2	<p>Reason abstractly and quantitatively</p> <p>Mathematically proficient fourth graders should recognize that a number represents a specific quantity. They connect the quantity to written symbols and create a logical representation of the problem at hand, considering both the appropriate units involved and the meaning of quantities. They extend this understanding from whole numbers to their work with fractions and decimals. Students write simple expressions, record calculations with numbers, and represent or round numbers using place value concepts.</p>
3	<p>Construct viable arguments and critique the reasoning of others</p> <p>In fourth grade mathematically proficient students may construct arguments using concrete referents, such as objects, pictures, and drawings. They explain their thinking and make connections between models and equations. They refine their mathematical communication skills as they participate in mathematical discussions involving questions like “How did you get that?” and “Why is that true?” They explain their thinking to others and respond to others’ thinking.</p>
4	<p>Model with mathematics</p> <p>Mathematically proficient fourth grade students experiment with representing problem situations in multiple ways including numbers, words (mathematical language), drawing pictures, using objects, making a chart, list, or graph, creating equations, etc. Students need opportunities to connect the different representations and explain the connections. They should be able to use all of these representations as needed. Fourth graders should evaluate their results in the context of the situation and reflect on whether the results make sense.</p>

Third Grade Unit 1: Properties of Multiplication

5	Use appropriate tools strategically
	Mathematically proficient fourth graders consider the available tools(including estimation) when solving a mathematical problem and decide when certain tools might be helpful. For instance, they may use graph paper or a number line to represent and compare decimals and protractors to measure angles. They use other measurement tools to understand the relative size of units within a system and express measurements given in larger units in terms of smaller units.
6	Attend to precision
	As fourth graders develop their mathematical communication skills, they try to use clear and precise language in their discussions with others and in their own reasoning. They are careful about specifying units of measure and state the meaning of the symbols they choose. For instance, they use appropriate labels when creating a line plot.
7	Look for and make use of structure
	In fourth grade mathematically proficient students look closely to discover a pattern or structure. For instance, students use properties of operations to explain calculations (partial products model). They relate representations of counting problems such as tree diagrams and arrays to the multiplication principal of counting. They generate number or shape patterns that follow a given rule.
8	Look for and express regularity in repeated reasoning
	Students in fourth grade should notice repetitive actions in computation to make generalizations Students use models to explain calculations and understand how algorithms work. They also use models to examine patterns and generate their own algorithms. For example, students use visual fraction models to write equivalent fractions.

Effective Mathematics Teaching Practices

Establish mathematics goals to focus learning. Effective teaching of mathematics establishes clear goals for the mathematics that students are learning, situates goals within learning progressions, and uses the goals to guide instructional decisions.

Implement tasks that promote reasoning and problem solving. Effective teaching of mathematics engages students in solving and discussing tasks that promote mathematical reasoning and problem solving and allow multiple entry points and varied solution strategies.

Use and connect mathematical representations. Effective teaching of mathematics engages students in making connections among mathematical representations to deepen understanding of mathematics concepts and procedures and as tools for problem solving.

Facilitate meaningful mathematical discourse. Effective teaching of mathematics facilitates discourse among students to build shared understanding of mathematical ideas by analyzing and comparing student approaches and arguments.

Pose purposeful questions. Effective teaching of mathematics uses purposeful questions to assess and advance students' reasoning and sense making about important mathematical ideas and relationships.

Build procedural fluency from conceptual understanding. Effective teaching of mathematics builds fluency with procedures on a foundation of conceptual understanding so that students, over time, become skillful in using procedures flexibly as they solve contextual and mathematical problems.

Support productive struggle in learning mathematics. Effective teaching of mathematics consistently provides students, individually and collectively, with opportunities and supports to engage in productive struggle as they grapple with mathematical ideas and relationships.

Elicit and use evidence of student thinking. Effective teaching of mathematics uses evidence of student thinking to assess progress toward mathematical understanding and to adjust instruction continually in ways that support and extend learning.

<u>5 Practices for Orchestrating Productive Mathematics Discussions</u>	
Practice	Description/ Questions
1. Anticipating	<p>What strategies are students likely to use to approach or solve a challenging high-level mathematical task?</p> <p>How do you respond to the work that students are likely to produce?</p> <p>Which strategies from student work will be most useful in addressing the mathematical goals?</p>
2. Monitoring	<p>Paying attention to what and how students are thinking during the lesson.</p> <p>Students working in pairs or groups</p> <p>Listening to and making note of what students are discussing and the strategies they are using</p> <p>Asking students questions that will help them stay on track or help them think more deeply about the task. (Promote productive struggle)</p>
3. Selecting	<p>This is the process of deciding the <i>what</i> and the <i>who</i> to focus on during the discussion.</p>
4. Sequencing	<p>What order will the solutions be shared with the class?</p>
5. Connecting	<p>Asking the questions that will make the mathematics explicit and understandable.</p> <p>Focus must be on mathematical meaning and relationships; making links between mathematical ideas and representations.</p>

MATH CENTERS/ WORKSTATIONS

Math workstations allow students to engage in authentic and meaningful hands-on learning. They often last for several weeks, giving students time to reinforce or extend their prior instruction. Before students have an opportunity to use the materials in a station, introduce them to the whole class, several times. Once they have an understanding of the concept, the materials are then added to the work stations.

Station Organization and Management Sample

Teacher A has 12 containers labeled 1 to 12. The numbers correspond to the numbers on the rotation chart. She pairs students who can work well together, who have similar skills, and who need more practice on the same concepts or skills. Each day during math work stations, students use the center chart to see which box they will be using and who their partner will be. Everything they need for their station will be in their box. **Each station is differentiated.** If students need more practice and experience working on numbers 0 to 10, those will be the only numbers in their box. If they are ready to move on into the teens, then she will place higher number activities into the box for them to work with.



In the beginning there is a lot of prepping involved in gathering, creating, and organizing the work stations. However, once all of the initial work is complete, the stations are easy to manage. Many of her stations stay in rotation for three or four weeks to give students ample opportunity to master the skills and concepts.

Read *Math Work Stations* by Debbie Diller.

In her book, she leads you step-by-step through the process of implementing work stations.

MATH WORKSTATION INFORMATION CARD

Math Workstation: _____

Time: _____

NJSLS:

Objective(s): By the end of this task, I will be able to:

- _____
- _____
- _____

Task(s):

- _____
- _____
- _____
- _____

Exit Ticket:

- _____
- _____
- _____

MATH WORKSTATION SCHEDULE

Week of: _____

DAY	Technology Lab	Problem Solving Lab	Fluency Lab	Math Journal	Small Group Instruction
Mon.	Group ____	Group ____	Group ____	Group ____	BASED ON CURRENT OB- SERVATIONAL DA- TA
Tues.	Group ____	Group ____	Group ____	Group ____	
Wed.	Group ____	Group ____	Group ____	Group ____	
Thurs.	Group ____	Group ____	Group ____	Group ____	
Fri.	Group ____	Group ____	Group ____	Group ____	

INSTRUCTIONAL GROUPING

	GROUP A		GROUP B
1		1	
2		2	
3		3	
4		4	
5		5	
6		6	
	GROUP C		GROUP D
1		1	
2		2	
3		3	
4		4	
5		5	

Third Grade PLD Rubric

Got It		Not There Yet		
Evidence shows that the student essentially has the target concept or big math idea.		Student shows evidence of a major misunderstanding, incorrect concepts or procedure, or a failure to engage in the task.		
PLD Level 5: 100% Distinguished command	PLD Level 4: 89% Strong Command	PLD Level 3: 79% Moderate Command	PLD Level 2: 69% Partial Command	PLD Level 1: 59% Little Command
<p>Student work shows distinguished levels of understanding of the mathematics.</p> <p>Student constructs and communicates a complete response based on explanations/reasoning using the:</p> <ul style="list-style-type: none"> properties of operations relationship between addition and subtraction relationship Use of math vocabulary <p>Response includes an efficient and logical progression of mathematical reasoning and understanding.</p>	<p>Student work shows strong levels of understanding of the mathematics.</p> <p>Student constructs and communicates a complete response based on explanations/reasoning using the:</p> <ul style="list-style-type: none"> properties of operations relationship between addition and subtraction relationship Use of math vocabulary <p>Response includes a logical progression of mathematical reasoning and understanding.</p>	<p>Student work shows moderate levels of understanding of the mathematics.</p> <p>Student constructs and communicates a complete response based on explanations/reasoning using the:</p> <ul style="list-style-type: none"> properties of operations relationship between addition and subtraction relationship Use of math vocabulary <p>Response includes a logical but incomplete progression of mathematical reasoning and understanding. Contains minor errors.</p>	<p>Student work shows partial understanding of the mathematics.</p> <p>Student constructs and communicates an incomplete response based on student's attempts of explanations/ reasoning using the:</p> <ul style="list-style-type: none"> properties of operations relationship between addition and subtraction relationship Use of math vocabulary <p>Response includes an incomplete or illogical progression of mathematical reasoning and understanding.</p>	<p>Student work shows little understanding of the mathematics.</p> <p>Student attempts to construct and communicates a response using the:</p> <ul style="list-style-type: none"> properties of operations relationship between addition and subtraction relationship Use of math vocabulary <p>Response includes limited evidence of the progression of mathematical reasoning and understanding.</p>
5 points	4 points	3 points	2 points	1 point

DATA DRIVEN INSTRUCTION

Formative assessments inform instructional decisions. Taking inventories and assessments, observing reading and writing behaviors, studying work samples and listening to student talk are essential components of gathering data. When we take notes, ask questions in a student conference, lean in while a student is working or utilize a more formal assessment we are gathering data. Learning how to take the data and record it in a meaningful way is the beginning of the cycle.

Analysis of the data is an important step in the process. What is this data telling us? We must look for patterns, as well as compare the notes we have taken with work samples and other assessments. We need to decide what are the strengths and needs of individuals, small groups of students and the entire class. Sometimes it helps to work with others at your grade level to analyze the data.

Once we have analyzed our data and created our findings, it is time to make informed instructional decisions. These decisions are guided by the following questions:

- What mathematical practice(s) and strategies will I utilize to teach to these needs?
- What sort of grouping will allow for the best opportunity for the students to learn what it is I see as a need?
- Will I teach these strategies to the whole class, in a small guided group or in an individual conference?
- Which method and grouping will be the most effective and efficient? What specific objective(s) will I be teaching?

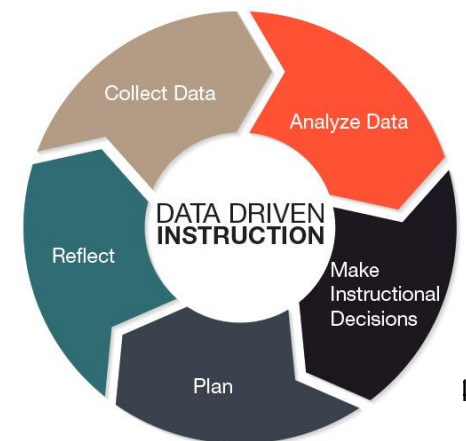
Answering these questions will help inform instructional decisions and will influence lesson planning.

Then we create our instructional plan for the unit/month/week/day and specific lessons.

It's important now to reflect on what you have taught.

Did you observe evidence of student learning through your checks for understanding, and through direct application in student work?

What did you hear and see students doing in their reading and writing?



Data Analysis Form

School: _____ **Teacher:** _____ **Date:** _____

Assessment: _____

NJSLS: _____

GROUPS (STUDENT INITIALS)	SUPPORT PLAN	PROGRESS
MASTERED (86% - 100%) (PLD 4/5):		
DEVELOPING (67% - 85%) (PLD 3):		
INSECURE (51%-65%) (PLD 2):		
BEGINNING (0%-50%) (PLD 1):		

MATH PORTFOLIO EXPECTATIONS

The Student Assessment Portfolios for Mathematics are used as a means of documenting and evaluating students' academic growth and development over time and in relation to the NJSL. The September task entry(-ies) should reflect the prior year content and *can serve* as an additional baseline measure.

All tasks contained within the **Student Assessment Portfolios** should be aligned to NJSL and be “practice forward” (closely aligned to the Standards for Mathematical Practice).

Four (4) or more additional tasks will be included in the **Student Assessment Portfolios** for Student Reflection and will be labeled as such.

GENERAL PORTFOLIO EXPECTATIONS:

- Tasks contained within the Student Assessment Portfolios are “practice forward” and denoted as “Individual”, “Partner/Group”, and “Individual w/Opportunity for Student Interviews¹”.
- Each Student Assessment Portfolio should contain a “Task Log” that documents all tasks, standards, and rubric scores aligned to the performance level descriptors (PLDs).
- Student work should be attached to a completed rubric; with appropriate teacher feedback on student work.
- Students will have multiple opportunities to revisit certain standards. Teachers will capture each additional opportunity “as a new and separate score” in the task log.
- A 2-pocket folder for each Student Assessment Portfolio is *recommended*.
- All Student Assessment Portfolio entries should be scored and recorded as an Authentic Assessment grade (25%)².
- All Student Assessment Portfolios must be clearly labeled, maintained for all students, inclusive of constructive teacher and student feedback and accessible for review.

Cookie Dough

Name: _____

Clear Creek School is fundraising.
They are selling Cookie Dough in tubs.

Chocolate Chip Cookie Dough	Peanut Butter Cookie Dough	Oatmeal Cookie Dough
\$5 a tub	\$4 a tub	\$3 a tub

1. Jill sold 2 tubs of Oatmeal Cookie Dough. How much money did she raise?
2. Joe sold 4 tubs of Peanut Butter Cookie Dough and 4 tubs of Chocolate Chip Cookie Dough. How much money did he raise in all? Show how you figured it out.
3. Jade sold only Peanut Butter Cookie Dough and she raised \$32. How many tubs did she sell? Show how you figured it out.
4. Jermaine's mother loves oatmeal cookies. She has \$20 to spend. What is the greatest number of tubs of Oatmeal Cookie Dough she can buy? Explain how you figured this out.

Authentic Assessment Scoring Rubric – Cookie Dough

3.OA.7: Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that $8 \times 5 = 40$, one knows $40 \div 5 = 8$) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.

Mathematical Practice: 1, 6

Type: Individual

<p>SOLUTION:</p> <p>1. \$6 2. \$36 3. 8 tubs 4. 6 tubs</p>				
<p>Level 5: 4 Correct Answers Distinguished Command</p>	<p>Level 4: 3 Correct Answers Strong Command</p>	<p>Level 3: 2 Correct Answers Moderate Command</p>	<p>Level 2: 1 Correct Answers Partial Command</p>	<p>Level 1: No Correct Answers No Command</p>
<p>Clearly constructs and communicates a complete response based on explanations/reasoning using the:</p> <ul style="list-style-type: none"> • Properties of operations • Relationship between multiplication and division <p>Response includes an efficient and logical progression of steps.</p>	<p>Clearly constructs and communicates a complete response based on explanations/reasoning using the:</p> <ul style="list-style-type: none"> • Properties based on place value • properties of operations • relationship between addition and subtraction <p>Response includes a logical progression of steps.</p>	<p>Constructs and communicates a complete response based on explanations/reasoning using the:</p> <ul style="list-style-type: none"> • Properties of operations • Relationship between multiplication and division <p>Response includes a logical but incomplete progression of steps. Minor calculation errors.</p>	<p>Constructs and communicates an incomplete response based on explanations/reasoning using the:</p> <ul style="list-style-type: none"> • Properties of operations • relationship between multiplication and division <p>Response includes an incomplete or illogical progression of steps.</p>	<p>The student shows no work or justification</p>

Core Instructional and Supplemental Materials (K-5)

EUREKA MATH V. 2019
(GREAT MINDS)

GRADE	TEACHER RESOURCES	STUDENT RESOURCES
K (v. 2019.)	<ul style="list-style-type: none"> • Teacher Edition: Module 1-6 • Eureka Math Teacher Resource Pack • Eureka K-5 PD Toolkit 	<ul style="list-style-type: none"> • Learn Workbook Set: Module 1-6 • Succeed Workbook Set: Module 1-6 • Practice Workbook, Fluency: Module 1-6
1	<ul style="list-style-type: none"> • Teacher Edition: Module 1-6 • Eureka Math Teacher Resource Pack • Eureka K-5 PD Toolkit 	<ul style="list-style-type: none"> • Learn Workbook Set: Module 1-6 • Succeed Workbook Set: Module 1-6 • Practice Workbook, Fluency: Module 1-6
2	<ul style="list-style-type: none"> • Teacher Edition: Module 1-8 • Eureka Math Teacher Resource Pack • Eureka K-5 PD Toolkit 	<ul style="list-style-type: none"> • Learn Workbook Set: Module 1-8 • Succeed Workbook Set: Module 1-8 • Practice Workbook, Fluency: Module 1-8
3	<ul style="list-style-type: none"> • Teacher Edition: Module 1-7 • Eureka Math Teacher Resource Pack • Eureka K-5 PD Toolkit 	<ul style="list-style-type: none"> • Learn Workbook Set: Module 1-7 • Succeed Workbook Set: Module 1-7 • Practice Workbook, Fluency: Module 1-7
4	<ul style="list-style-type: none"> • Teacher Edition: Module 1-7 • Eureka Math Teacher Resource Pack • Eureka K-5 PD Toolkit 	<ul style="list-style-type: none"> • Learn Workbook Set: Module 1-7 • Succeed Workbook Set: Module 1-7 • Practice Workbook, Fluency: Module 1-7
5	<ul style="list-style-type: none"> • Teacher Edition: Module 1-7 • Eureka Math Teacher Resource Pack • Eureka K-5 PD Toolkit 	<ul style="list-style-type: none"> • Learn Workbook Set: Module 1-7 • Succeed Workbook Set: Module 1-7 • Practice Workbook, Fluency: Module 1-7
	<ul style="list-style-type: none"> • Teacher Edition: Module 1-6 • Eureka Math Teacher Resource Pack • Eureka K-5 PD Toolkit 	<ul style="list-style-type: none"> • Learn Workbook Set: Module 1-6 • Succeed Workbook Set: Module 1-6 • Practice Workbook, Fluency: Module 1-6

MATH IN FOCUS v. 2015
(HOUGHTON MIFFLIN HARCOURT)

GRADE	TEACHER RESOURCES	STUDENT RESOURCES
K	<ul style="list-style-type: none">• Teacher Edition (A & B)• Implementation Guide• Assessment Package• Enrichment Bundle• Extra Practice Set• Teacher and Student Activity Cards• Home -to- School Connection Book• Online Teacher Technology Kit• Big Book Set• Online Interactive Whiteboard Lessons	<ul style="list-style-type: none">• Student Edition A – Pt. 1• Student Edition A – Pt. 2• Student Edition B – Pt. 1• Student Edition B – Pt. 2• Online Student Technology Kit
1	<ul style="list-style-type: none">• Teacher Edition (A & B)• Implementation Guide• Assessment Package• Enrichment Bundle• Extra Practice Guide• Reteaching Guide• Home -to- School Connection Book• Online Teacher Technology Kit• Fact Fluency• Online Interactive Whiteboard Lessons	<ul style="list-style-type: none">• Student Texts (A & B)• Student Workbooks• Online Student Technology Kit• Student Interactivities
2-5	<ul style="list-style-type: none">• Teacher Edition (A & B)• Implementation Guide• Assessment Package• Enrichment Bundle• Extra Practice Guide• Transition Guides• Reteaching Guide• Home -to- School Connection Book• Online Teacher Technology Kit• Fact Fluency• Online Interactive Whiteboard Lessons	<ul style="list-style-type: none">• Student Texts (A & B)• Student Workbooks• Online Student Technology Kit• Student Interactivities

Supplemental Resources

Great Minds

<https://greatminds.org/>

Embarc

<https://embarc.online/>

Engage NY

[http://www.engageny.org/video-library?f\[0\]=im_field_subject%3A19](http://www.engageny.org/video-library?f[0]=im_field_subject%3A19)

Common Core Tools

<http://commoncoretools.me/>

<http://www.ccsstoolbox.com/>

<http://www.achievethecore.org/steal-these-tools>

Achieve the Core

<http://achievethecore.org/dashboard/300/search/6/1/0/1/2/3/4/5/6/7/8/9/10/11/12>

Manipulatives

<http://nlvm.usu.edu/en/nav/vlibrary.html>

<http://www.explorelearning.com/index.cfm?method=cResource.dspBrowseCorrelations&v=s&id=USA-000>

<http://www.thinkingblocks.com/>

Illustrative Math Project :<http://illustrativemathematics.org/standards/k8>

Inside Mathematics: <http://www.insidemathematics.org/index.php/tools-for-teachers>

Sample Balance Math Tasks: <http://www.nottingham.ac.uk/~ttzedweb/MARS/tasks/>

Georgia Department of Education:<https://www.georgiastandards.org/Common-Core/Pages/Math-K-5.aspx>

Gates Foundations Tasks:<http://www.gatesfoundation.org/college-ready-education/Documents/supporting-instruction-cards-math.pdf>

References

“Eureka Math” *Great Minds*. 2018 < <https://greatminds.org/account/products>