

## UDL AND MATHMEMATICS

### LESSON OVERVIEW

**Title:** Building Blocks for Multiplication and Division

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**Subject:** Math

**Grade Level** – 3<sup>th</sup> grade

**Duration** – 45 minutes

**Unit Description** – Multiplying and dividing whole numbers using building blocks from physical interaction.

#### Lesson Goals –

- Being able to multiply and divide whole numbers.
- Learn how to use building blocks as a physical way to figuring out the equations.
- Reading mathematic word sheets with word problems (simple to complex sentences).

#### Common Core Standards –

*CCSS.MATH.CONTENT.3.OA.A.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  $8 \times ? = 48$ ,  $5 = \_ \div 3$ ,  $6 \times 6 = ?$

#### Big Ideas –

- Building blocks used as a tool can help solve multiplication and division problems to represent the numbers for a visual display for explanation.

#### Barriers –

- Being able to build the blocks (gripping disability).
- Not being able to count up to 10 or counting on.
- Problems with reading the math sentence (reading disability while also having comprehension problems).
- EI when it comes to frustration level.

#### UDL Checkpoints –

*Guideline 5:* Provide options of expression and communication

- Checkpoint 5.1 – Use multiple media for communication
- Checkpoint 5.2 – Use multiple tools for construction and composition

*Guideline 9:* Provide options of self-regulation

- Checkpoint 9.2 – Facilitate personal coping skills and strategies

*Guideline 8:* Provide options for sustaining effort and persistence

- Checkpoint 8.1 – Heighten salience of goals and objectives

*Guideline 6:* Provide options of executive functions

- Checkpoint 6.2 – Support planning and strategy development

*Guideline 1:* Provide options for perception

- Checkpoint 1.3 – Offer alternatives for visual information

*Guideline 2:* Provide options for language, mathematical expressions, and symbols

- Checkpoint 2.1 – Clarify vocabulary and symbols
- Checkpoint 2.5 – Illustrate through multiple media

*Guideline 7:* Provide options for recruiting interest

- Checkpoint 7.3 – Minimize threats and distractions

## METHOD

### Anticipatory Set

#### Vocabulary

- Array – Mathematics and arrangement of quantities or symbols in rows and columns; a matrix
- Multiplication – Mathematics the process of combining matrices, vectors, or other quantities under specific rules to obtain their product
- Division – Mathematics the process of dividing a matrix, vector, or other quantity by another under specific rules to obtain a quotient.
- Lattice Method – an alternative to long multiplication for numbers

#### Background Knowledge

1. Reference addition problems.
2. Have the students do a few addition problems to get them comfortable with the use of the building blocks.

#### Behavior Expectations

- Students will not misuse the materials that will be used.
- All students should be considerate with others feelings.
- Help out a friend when you see they need help.
- Don't ever feel discouraged.

#### Checkpoint 7.3

*Not all students are on the same level in math. It is very easy for students to become frustrated because they don't understand the material. Students should be there to help each other and bring them up and discourage them.*

#### Material

- After background knowledge has been done, materials such as the worksheets and the blocks should begin to be handed out.

## Introduce and Model New Knowledge

### Checkpoint 2.1

1. Go step by step in identifying the different symbols. First go through addition and subtraction problems. Go over the addition sign, the subtraction sign, and then the equal.
2. Transition more into the multiplication and division problems. Breakdown the problems like the addition and subtraction just were. Identify the multiplication symbol, the division symbol, and then the equal.
3. Teach the students how to read and write a multiplication and division problems.  
EX. Four times five equals twenty  $\sim 4 * 5 = 20$
4. Bring attention to array. Arrays are a 2-dimensionsal picture that is usually represented with bullets that are stacked in rows and columns.

*Activity: Create Popsicle stick flaggers. The flaggers have the math symbols. There should be a little sing along activity to help students remember that this signal means multiply, while another means to divide. It would be more concrete evidence that there is a separation between the two.*

## Provide Guided Practice

1. Do starter problems with the students showing how an array looks and how to read them when it comes to multiplying the numbers. Students will count the number of bullets are in a row. Then students should count the number of bullets in the column. Once they have counted, the students should multiply the two numbers together. The sum of the numbers will be exactly the same amount of bullets are in the array total.
2. Students should first build the column and then the row then multiply. To check if they're correct, student can count the bullets in the end. Students should never just count the number of bullets in the beginning or there won't be learning occurring.
3. To make it easier for the students to do the math problems, begin using the blocks. Model how the students should use the blocks.  
EX. If I take two blocks and place them in a column. Then take two blocks and place them in a row. We should have two blocks in our column, and then three blocks in our row. Three because the column and row share one block. So we have 2 by 3, which is  $2 * 3$ , and it will equal?
4. During the lesson, the instructor should be incorporating vocabulary words for the students to get more used to hearing and seeing them.
5. Students should begin doing the activity on their own. Instructor should walk around the room to monitor the behavior of the students and go around to answer any questions. But please set aside math table for students who struggle. Other students can lead this table but if it is still challenging for those students, the instructor will have to step in and work with these students.

### Checkpoint 1.3

*The building blocks are there to help some students physically see the math problem if they can't do mental math. The blocks aren't a crutch. It is an aide.*

### Checkpoint 6.2

*Student should visit their peers before they come seek help from the instructor. Possibly can learn better when they speak to someone their age and understand their mind frame.*

## Provide Independent Practice

1. After following along with the instructor in the guided practice, students will be able to break away and do the math worksheet alone.
2. Student should remember the tips the instructor said about reading math problems. Should remember the difference in math symbols that the meanings. Checkpoint 5.2
3. Students can do mental math if there is no need for the blocks. Blocks are only set in place for students who need to visually see the math problem. *The building blocks are manipulative that the students can use to visually see to help further their understanding.*
4. Students as other students for help before they come to the instructor to receive aid. Student can learn from peers.
5. If the math blocks don't work, transition into Lattice Method. The Lattice Method is something the students have previous learned. They should already know the techniques about creating a box that has the same amount of rows and column as the numbers they are trying to solve for. Reminder: Lattice Method is only good for more than two digit numbers. Checkpoint 2.5  
*The Lattice Method as another learning tool other than the blocks.*
6. There may be times where the students will become frustrated with the difficulty of the activity. Instead of shutting down, suggest that the students should take 5-minute brain breaks. Students have freedom to do jumping jacks and stretch. Students shouldn't get wound up and begin to run around the classroom. Monitor behavior and how long the student is on a brain break. Checkpoint 9.2  
*Students can take a math brain break. They can step away from the work and jump around to relax.*

## WRAP UP

After the students have finished the math worksheet, the instructor should bring the class in so they can go over the questions together. As the instructor is going through the problems, students at this time should be making corrections to their answers or their work to make sure they are doing it right. Students shouldn't erase their original work. The instructor should want to see what their students initially thought to help them change their future explanation when it comes to this math topic.

## ASSESSMENT

A Math Minute will be used for the assessment. Students are required to do mental math and finish as many problems on the worksheet as they can within that minute. Students should reach for their goal of a certain amount of problems answered. Not all students have the same goal. Individualized. Then some students can shoot for finishing the whole worksheet within that minute. After the Math Minute is finished, instructor will collect the sheets and later grade and correct students' work. Checkpoint 8.1

*Have a rewards chart that marks the students' achievement in the math ladder. Each math minute that is passed, the student will receive a sticker. The stickers will accumulate until their personal board is full. Once it is full, the students can come and receive a prize for their outstanding work in math.*

## MATERIALS

Math worksheets  
Building blocks  
Lattice Method boards

## Section 2: The UDL Elements

<b>Engagement</b>	
<b>Which checkpoint did you incorporate?</b>	<b>How and why?</b>
Checkpoint 9.2	Students can take a math brain break. They can step away from the work and jump around to relax.
Checkpoint 8.1	Have a rewards chart that marks the students' achievement in the math ladder. Each math minute that is passed, the student will receive a sticker. The stickers will accumulate until their personal board is full. Once it is full, the students can come and receive a prize for their outstanding work in math.
Checkpoint 7.3	Telling the students to have an equal respect for each other. Not all students may have been on the same level. Be patient and considerate of each other.

<b>Representation</b>	
<b>Which checkpoint did you incorporate?</b>	<b>How and why?</b>
Checkpoint 1.3	The blocks are set into place for students who aren't able to do mental math. It is just a physical visual for the students whose learning style works well with.
Checkpoint 2.1	Go over math symbols and how to read a math problem from left to right. But also being able to understand if the numbers are flipped.
Checkpoint 2.5	Lattice method as another sources other than the blocks.

<b>Action and Expression</b>	
<b>Which checkpoint did you incorporate?</b>	<b>How and why?</b>
Checkpoint 5.1	The building blocks are a great tool for the students to use for when they're calculating the math work out. The students will be able to physically manipulate the blocks and get a visual of what's occurring.
Checkpoint 5.2	The building blocks are manipulative that

	the students can use to visually see to help further their understanding.
Checkpoint 6.2	Student should visit their peers before they come seek help from the instructor.

**CEP 452: Lesson Plan**  
**Section 3: Other UDL Ideas**

<b>Engagement</b>	
<b>Activity</b>	<b>How would this help students meet the goal?</b>
Monopoly	Role the die and multiply the numbers the die land on. Whatever number is the solution, the student will hop that many spaces.
Using pictures	Instead of blocks, students can use real world pictures to multiply and divide.
Creative writing	Students can write their own story problems that are based around multiplication and division.

<b>Representation</b>	
<b>Activity</b>	<b>How would this help students meet the goal?</b>
Math song	Students can make a sing along of how the steps to solve math problems.
Hopscotch	Use the playground as a resource. Hop a few spaces and then hop another. Multiply those numbers together to get the solution.
Crossword puzzle	Can take the vocabulary in lesson and the definitions and to create a crossword puzzle. Students can become familiar with the definitions.

<b>Action and Expression</b>	
<b>How would this help students meet the goal?</b>	<b>How would this help students meet the goal?</b>
Math minute	Having worksheets based around multiplication and division that is timed for one minute. The students must try to achieve their goal in the amount they answer or they can go for it and complete the whole worksheet. This can be used in the assessment.
Flyswatter math	There will be a powerpoint game that will display multiplication and division



	problems. Two students at a time will go head to head in playing. When the math problem is displayed, the students must think fast and slap the correct answer. Each student will get a chance to play until there can be an elimination round.
Xtra Math	A website where students can go to play math problems. It's mental math. The math problems cater to the student's level than being at grade level work.