

Grade Level / Content Area: *Grade 3-5 / Math – Division and Multiplication*

Standards: CCSS.MATH.CONTENT.5.NBT.B.6

Concept/Topic to Teach: *Relate Division and Multiplication using Arrays*

### *I. Getting students set to learn Addition*

**Introduction/Review;** Review the work recently done by the class related to division and multiplication.

**Anticipatory Set;** Explain that we are going to learn how multiplication and Division are related by using arrays in today's lesson. Demonstrate what an array is.

**Objectives;**

- The students will be able to multiply numbers (equaling up to 24) using arrays where the number of rows is multiplied by the number of columns or the number of columns is multiplied by the number of rows.
- The students will be able to divide numbers (equaling up to 24) using arrays where the total number of parts is divided by the number of columns to equal the number of rows or the total number of parts is divided by the number of rows to equal the number of columns.
- Students will explain to the teacher how multiplication and division using arrays can be used to multiply or divide even larger numbers and develop their skills with smaller numbers.

### *II. Instruction*

- **Input and Modeling;** Go through the first two examples from the work sheet together. Remind students of the importance of listening to or reading the question carefully before answering it. Ask the students to complete the remainder of the first worksheet page.

### *III. Checking for understanding*

**Checking Understanding;** Review the student's completed first worksheet pages and explain any errors.

**Guided Practice;** Have the students complete the second page of the worksheet.

### *IV. Independent practice – Hands-On Learning*

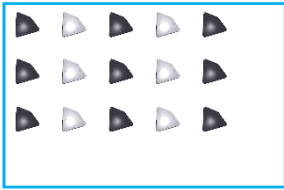
**Independent Practice;**

Pass out the HyPars Educational kits to the students and indicate these parts will be used to learn more about division and multiplication (equaling up to 24) using arrays and to demonstrate how multiplication and division are related.

- From the HyPars Educational Kit, have each student get twenty parts (some HyPars and some Connectors) and make a four row by five column array of parts.
- Ask the students what  $4 \times 5$  equals (have them count the parts they have for the answer if necessary).
- Have the students divide the total number of parts by the number of rows in their arrays and show that equals the number of columns in the array.
- Have the students divide the total number of parts by the number of columns in their arrays and show that equals the number of rows in the array.
- Ask the students to assemble (connect) the entire group of parts and then again ask how many parts are in this first assembly.
- Upon confirmation of each student understanding the division and multiplication of  $4 \times 5$ , have the students get twenty-four more parts (including some HyPars and some Connectors) from the HyPars Educational Kits and have them make a three row by eight column array.
- Ask the students what  $3 \times 8$  equals (have them count the parts they have for the answer if necessary)
- Have the students divide the total number of parts by the number of rows in their arrays and show that equals the number of columns in the array.
- Have the students divide the total number of parts by the number of columns in their arrays and show that equals the number of rows in the array.
- Have the students disassemble their assembly and put the parts away back into their HyPars Educational Kits.

## Relate Division and Multiplication using Arrays Worksheet

1. Multiply the number of HyPar rows by the number of HyPar columns in the Figure and write the multiplication equation on the first line. Write two division equations on the second and third lines.



- a) Multiplication Sentence; \_\_\_\_\_ X \_\_\_\_\_ = \_\_\_\_\_  
 b) Division Sentence; \_\_\_\_\_ X \_\_\_\_\_ = \_\_\_\_\_  
 c) Division Sentence; \_\_\_\_\_ X \_\_\_\_\_ = \_\_\_\_\_

2. Multiply the number of Connector rows by the number of Connector columns in the Figure and write the multiplication equation on the first line. Write two division equations on the second and third lines.



- a) Multiplication Sentence; \_\_\_\_\_ X \_\_\_\_\_ = \_\_\_\_\_  
 b) Division Sentence; \_\_\_\_\_ X \_\_\_\_\_ = \_\_\_\_\_  
 c) Division Sentence; \_\_\_\_\_ X \_\_\_\_\_ = \_\_\_\_\_

3. Multiply the number of black HyPar rows by the number of black HyPar columns in the Figure and write the multiplication equation on the first line. Write two division equations on the second and third lines.



- a) Multiplication Sentence; \_\_\_\_\_ X \_\_\_\_\_ = \_\_\_\_\_  
 b) Division Sentence; \_\_\_\_\_ X \_\_\_\_\_ = \_\_\_\_\_  
 c) Division Sentence; \_\_\_\_\_ X \_\_\_\_\_ = \_\_\_\_\_

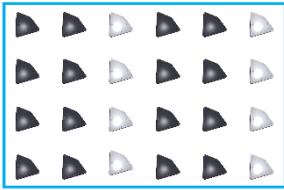
4. Multiply the number of black Connector rows by the number of black Connector columns in the Figure and write the multiplication equation on the first line. Write two division equations on the second and third lines.



- a) Multiplication Sentence; \_\_\_\_\_ X \_\_\_\_\_ = \_\_\_\_\_  
 b) Division Sentence; \_\_\_\_\_ X \_\_\_\_\_ = \_\_\_\_\_  
 c) Division Sentence; \_\_\_\_\_ X \_\_\_\_\_ = \_\_\_\_\_

## Relate Division and Multiplication using Arrays Worksheet

5. Multiply the number of HyPar rows by the number of HyPar columns in the Figure and write the multiplication equation on the first line. Write two division equations on the second and third lines.



- a) Multiplication Sentence; \_\_\_\_\_ X \_\_\_\_\_ = \_\_\_\_\_  
 b) Division Sentence; \_\_\_\_\_ X \_\_\_\_\_ = \_\_\_\_\_  
 c) Division Sentence; \_\_\_\_\_ X \_\_\_\_\_ = \_\_\_\_\_

6. Multiply the number of Connector rows by the number of Connector columns in the Figure and write the multiplication equation on the first line. Write two division equations on the second and third lines.



- a) Multiplication Sentence; \_\_\_\_\_ X \_\_\_\_\_ = \_\_\_\_\_  
 b) Division Sentence; \_\_\_\_\_ X \_\_\_\_\_ = \_\_\_\_\_  
 c) Division Sentence; \_\_\_\_\_ X \_\_\_\_\_ = \_\_\_\_\_

7. Multiply the number of white HyPar rows by the number of white HyPar columns in the Figure and write the multiplication equation on the first line. Write two division equations on the second and third lines.



- a) Multiplication Sentence; \_\_\_\_\_ X \_\_\_\_\_ = \_\_\_\_\_  
 b) Division Sentence; \_\_\_\_\_ X \_\_\_\_\_ = \_\_\_\_\_  
 c) Division Sentence; \_\_\_\_\_ X \_\_\_\_\_ = \_\_\_\_\_

8. Multiply the number of white Connector rows by the number of white Connector columns in the Figure and write the multiplication equation on the first line. Write two division equations on the second and third lines.



- a) Multiplication Sentence; \_\_\_\_\_ X \_\_\_\_\_ = \_\_\_\_\_  
 b) Division Sentence; \_\_\_\_\_ X \_\_\_\_\_ = \_\_\_\_\_  
 c) Division Sentence; \_\_\_\_\_ X \_\_\_\_\_ = \_\_\_\_\_