SCAFFOLDING TASK: Division Patterns

STANDARDS FOR MATHEMATICAL CONTENT

MCC.3.OA.2 Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 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.

STANDARDS OF MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

Students should begin to master multiplication facts in connection with division facts. When we are trying to determine the quotient for 36 ÷ 9, we are often think 9 times what number is going to give me 36. It is not a separate fact but closely tied together (Teacher Student-Centered Mathematics, John A. Van de Walle and LouAnn H. Lovin, 2006).

ESSENTIAL QUESTIONS

- How do the parts of a division problem relate to each other?
- What is the relationship between the divisor and the quotient?
- What happens to the quotient when the dividend increases or decreases?
- What do the parts of a division problem represent?

MATERIALS

"Division Patterns" recording sheet

GROUPING

Individual/Partner Task

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

In this task, students will analyze patterns in division.

Comments

You may want to demonstrate how to use the times table chart to determine the answers to basic division problems if students have not yet learned the division facts. Teaching the algorithm for long division **is not required at this point**, it will be addressed later in this unit.

You may want to open this task by reading and discussing, the events in *The Doorbell Rang* by Pat Hutchins or similar book. *The Doorbell Rang* is a story about dividing a batch of cookies by a varying number of children. Focus on how the number of cookies each child gets changes as the number of children increases.

Task Directions

Students will follow the directions below from the "Division Patterns" recording sheet.

There are three parts to every division problem: the dividend, the divisor, and the quotient. Look at the division problem below to understand what these terms mean:

28 ÷ 4 = △

28 is the dividend, the total amount before we divide.
4 is the divisor, the number of groups we will make **or** the number of items in each group.
△ is the quotient, number of items in each group **or** the number of groups.

1. Complete the chart.
2. What do you notice about the dividend numbers as you go from the top of the chart to the bottom of the chart?
3. What do you notice about the divisor numbers as you go from the top of the chart to the bottom of the chart?
4. What do you notice about the quotient numbers as you go from the top of the chart to the bottom of the chart?
5. Describe the pattern that shows the relationship between the dividend, divisor, and quotient.

Dividend		Divisor		Quotient
4		4		1
8		4		
12		4		
16		4		
20	÷	4	=	
24		4		
28		4		
32		4		
36		4		
40		4		

FORMATIVE ASSESSMENT QUESTIONS

- What is the same about all of the division problems?
- What is different about all of the division problems?
- What do you notice about the quotients of the division problems?
- Can you describe a pattern you see in this task?

DIFFERENTIATION

Extension

Have students experiment with keeping a different part of the division problem constant such as the quotient or dividend and make predictions about the outcomes. Have students record their results and describe their conclusions.

Intervention

Use base-ten manipulative pieces or grid paper as necessary for students who may need to model each division problem.

TECHNOLOGY CONNECTION

- http://mcq.wrdsb.on.ca/Admin/Documents/WORC/PDFs/LESSON%20PrimaryMath.pdf
- http://www.lessonplanspage.com/MathLAMultiplicationDivisionUsingTheDoorbellRang23.htm Both websites above provide teacher resources for the book *The Doorbell Rang* by Pat Hutchins.
- http://www.softschools.com/math/games/division_practice.jsp Division practice; the student or teacher can determine the parameters for the divisor, dividend, and number of problems

Name _____ Date _____

Division Patterns

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△ is the quotient, the number of items in each group.

1. Complete the following chart:

Dividend		Divisor		Quotient
4		4		1
8		4		
12		4		
16		4		
20	÷	4	=	
24		4		
28		4		
32		4		
36		4		
40		4		

2. What do you notice about the dividend numbers as you go from the top of the chart to the bottom of the chart?

_____

_____

_____

_____

3. What do you notice about the divisor numbers as you go from the top of the chart to the bottom of the chart?

_____

_____

_____

4. What do you notice about the quotient numbers as you go from the top of the chart to the bottom of the chart?

_____

_____

_____

5. Describe the pattern that shows the relationship between the dividend, divisor,

   and

   quotient._____

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