Session 4: Developing Multiplication and Division in All Grades

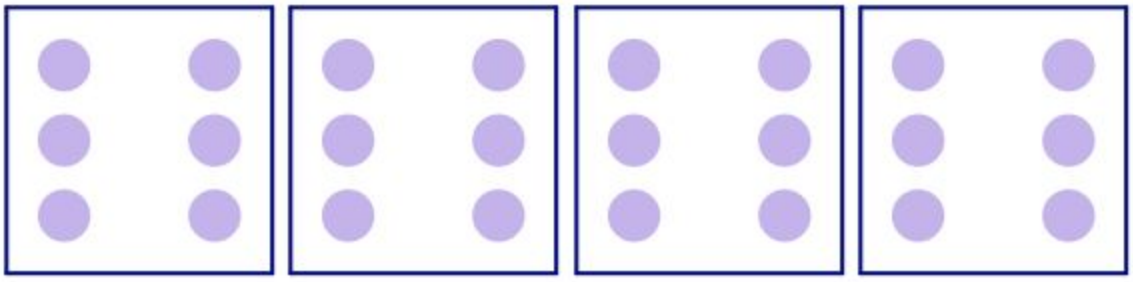
Goals:

I can carry out number talks (with dot patterns, symbols, array models, area models, and open rectangles) focused on multiplication and division with whole numbers.
I can highlight the distributive property as students compose and decompose groups of numbers.
I can identify the key features of multiplication and distinguish between two types of division.
I can write multiplication, partitive division, and measurement division word problems.
I can identify the various strategies that children use to solve multiplication and division problems.
Rehearsals - Eliciting and responding to student thinking. Orienting students to one another.

Building Mental Images for Multiplication

Equal Groups

How many purple dots are there altogether? How do you see them?



At What Grade?

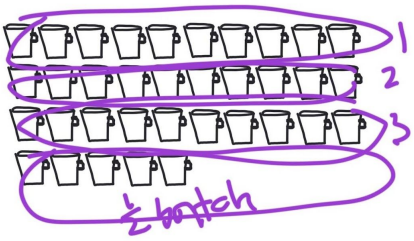
Predict the grade that most of the kids could correctly answer each problem.

Problem	Grade
A. Paco had 13 cookies. He ate 6 of them. How many cookies does Paco have left?	
B. Robin has 3 packages of gum. There are 6 pieces of gum in each package. How many pieces of gum does Robin have altogether?	
C. Carla has 7 dollars. How many more dollars does she have to earn to have 11 dollars to buy a puppy?	
D. Tad had 15 guppies. He put 3 guppies in each jar. How many jars did Tad put guppies in?	
E. James has 12 balloons. Amy has 7 balloons. How many more balloons does James have than Amy?	
F. Mr. Gomez had 20 cupcakes. He put the cupcakes into 4 boxes so that there was the same amount of cupcakes in each box. How many cupcakes did Mr. Gomez put in each box?	
G. Nineteen children were taking a minibus to the zoo. They will have to sit either 2 or 3 to a seat. The bus has seven seats. How many children will have to sit three to a seat, and how many can sit two to a seat?	
H. Maggie had 3 packages of cupcakes. There were four cupcakes in each package. She ate 5 of the cupcakes. How many cupcakes were left? *(multi step problem)*	
I. Nineteen children are going to the circus. Five children can ride in each car. How many cars will be needed to get all nineteen children to the circus?	

Commenting on Student Work

Jango has 30 cups of flour. Each batch of cupcakes requires 4 cups of flour. How many batches of flour can Jango make?

Andi



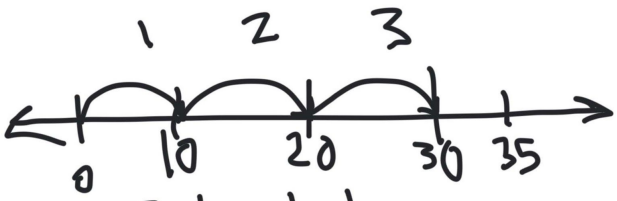
$3\frac{1}{2}$ batches

Biz

10, 20, 30

so 3 batches.

Clint



3 batches

Donald

3 batches with 5 cups leftover.

30 is 3 groups of 10 with 5 extra.

Multiplication Number Talk Using an Open Rectangle

$$12 \times 75$$

Multiplication Word Problem

Strategies

Direct Modeling

Skip Counting

Derived Fact

Multiplication Number Talk String

Doris

Kenzie

Distributive Property

Measurement Division $? \times 10 = 34$

Direct Modeling

Skip Counting

Derived Fact

Partitive Division (Equal Sharing) $3 \times ? = 36$

Direct Modeling

Skip Counting

Derived Fact

Saying Math Sentences

Type	Original Sentence	Transformed Sentence	Not so helpful language	Helpful language
Multiplication (total unknown)			"4 times 7"	"4 groups of 7"
Measurement Division (number of groups unknown)			"24 divided by 4"	"How many groups of 4 are in 24?"
Partitive Division (amount in each group unknown)			"12 divided by 3"	"How can 12 things be shared equally among 3 groups?