## The Ohio State University

## Mathematics Teaching Institute

## Day Two - Deconstructing the Operations

## Lunch <br> We will return at 12:45

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# Debrief: Never say anything a kid can say (Reinhart, 2000) 

The importance of considering student solution strategies and invented algorithms

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## My Favorite No: Learning From Mistakes

Bruner's Phases of Understanding


Deconstructing Multiplication and Division

1. Review the following students' responses to Pigs have 44 teeth and Wristbands at the Fair tasks.
2. If this is our evidence of a student's work for this task, what can we say with some degree of certainty that this student knows?

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 Mathematics coaching Propectour and yist used fours. Then I
problem Sels adde the tens and my finlle anser is:276.-


Wrist bands at the \$ate Fair cost $\$ 7$ each. How many wristbands can you buy for $\$ 50$ ?


Wristbands at the Spate Fair cost $\$ 7$ each. How many wristbands can you buy for $\$ 50$ ? 7


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Mathematics Coaching Project
Problem Sets

The language of equal groups and fair sharing: Deconstructing multiplication and division

How many groups? How many in each group? How many total?

What strategies do students use to solve these problems?

What specific connections do you see in comparing the students' invented algorithms for division?

How do these examples of student work lend themselves to the language of equal groups?


a. There are 47 children in a down-hilil skid clubh. A tuip to Devils, Heail costs 34 dollars for each child. How much does it cost to take everyonec in the club on a trip?


What strategies do students use to solve these problems?

What specific connections do you see in comparing the students' invented algorithms for division?

How do these examples of student work lend themselves to the language of equal groups?

## Sam



The student council picked 896 apples and packaged them in bags with 35 apples in each bag. How many bags
did they fill?

## Robin

$6+35=0$ with 6 left over
$90 \div 35 \quad 35+35=70 \quad 235$ s with 20 left over
$800 \div 35 \quad 35+35=70 \quad 70 \times 10=700 \quad 2035 s$ with 100 left over
2 more 35 s with 30 left over
$6+20+30=56$ leftovers will make one more group of 35 with 21 left over.
$0+2+20+2+1=25$ groups of 35

The Student council picked 896 apples and packaged them in bags with 35 apples in each bag. How many
bags did they fill?

# Aaron 

| 896 |  |
| :---: | :---: |
| $\frac{-350}{546}$ | 10 |
| $-\frac{350}{196}$ | 10 |
| $-\frac{70}{126}$ | 2 |
| $-\frac{70}{56}$ | 2 |
| $-\frac{35}{21}$ | 1 |

Figure 12 Aaron's invented algorithm for 896 divided into groups of 35

The student council picked 896 apples and packaged
them in bags with 35 apples in each bag. How many
bags did they fill?

# Break <br> See you in 10 minutes 

## Number Talks by Sherry Parrish

Video Case: Number Talks in Context from My Kids Can!

## Developing Mathematical Thinking



# Building fluency in basic facts 

"Faster isn't smarter" by Cathy Seeley
"Families Ask about Timed Tests" by Marilyn Burns
Memorization versus thinking skills

Please complete the daily feedback form

Homework: Read "13 Rules that Expire" (Karp,<br>Bush, \& Dougherty, 2014)

Please bring your Mathematics Curriculum Teacher's Manual on Wednesday Morning!

## Extra student work as needed




$$
\begin{array}{r}
14 \\
24 \\
24 \\
\hline 72
\end{array}
$$

Julie
7. A card store has 43 boxes of cards for Thanksgiving Day. Each pox hip 24 cards. How many Thanksgiving Day cords

$$
\begin{aligned}
& 24 \times 10=240 \\
& 24 \times 10=240 \\
& 24 \times 10=240 \quad \text { Emmen t. } \\
& 24 \times 10=240 \\
& 24 \times 3=\frac{9.2}{1,032}
\end{aligned}
$$

Bob


An elementary school has 24 classes. If there are 32 children in each class, how many children are there at the school?

101 Mar. Party has 153 bags of balloons at his party product store. Each bag has 37 balloons. How many balloons does Mr. Party have at his store?



Hattie had 544 candies to share with her friends. She gave each of her 17 friends the same amount of candy. How many candies did each friend get?


Hattie had 544 candies to share with her friends. She gave each of her 17 friends the same amount of candy. How many candies did each friend get?

Tiffany


Twelve children were sharing 228 M M's. How many should each child get?
Sally


There are 810 fifth-graders at the District olympics.
They are placed in teams of 6 . How many teams will there be?

