Fractions Through Equal Sharing
NCCTM
10/30/14

NAOMI JESSUP
AMY HEWITT
VICKI JACOBS
UNIVERSITY OF NORTH CAROLINA AT GREENSBORO

Solve It!

If you were a student, how would you solve this problem. Try to solve it two ways.
If you have time, share your strategy with someone close to you.

A zookeeper has 8 bananas to feed the 6 monkeys. If she wants to use up all the bananas and give the same amount to each monkey, how much should she give each monkey?

Equal Sharing Problems are

A type of division problem where the amount in each group is unknown .

Mr. Gomez has 12 cupcakes. He puts the cupcakes into 4 boxes so that there are the same number of cupcakes in each box. How many cupcakes did Mr. Gomez put in each box?

Total Amount Shared: 12 cupcakes

Numbers of Groups: 4 boxes

Amount in each group: **Unknown**

A zookeeper has 8 bananas to feed the 6 monkeys. If she wants to use up all the bananas and give the same amount to each monkey, how much should she give each monkey?

Total Amount Shared: 8 bananas

Numbers of Groups: 6 monkeys

Amount in each group: **Unknown**

Think about how a young child that has not had any formal instruction about multiplication or division problems. How do you think they would solve this problem?

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How did Alex solve the problem?
What does his strategy tell us about his understanding?

Think about how a young child that has not had any formal instruction fractions. How do you think they would solve this problems?

Four children want to share 10 candy bars so that everyone gets the same amount. How much candy can each child get?

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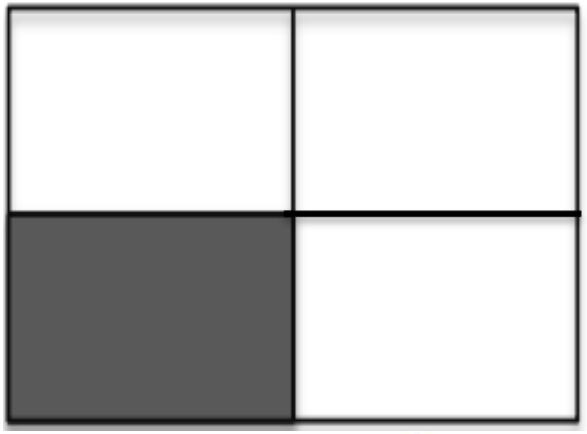
How did Lynorra solve the problem?
What does her strategy tell us about her understanding?

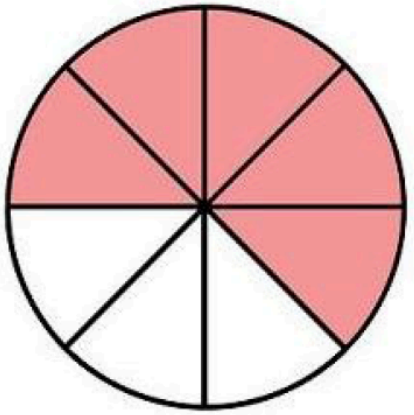
What do students understand?

Tell what fraction of each shape is shaded.

a.



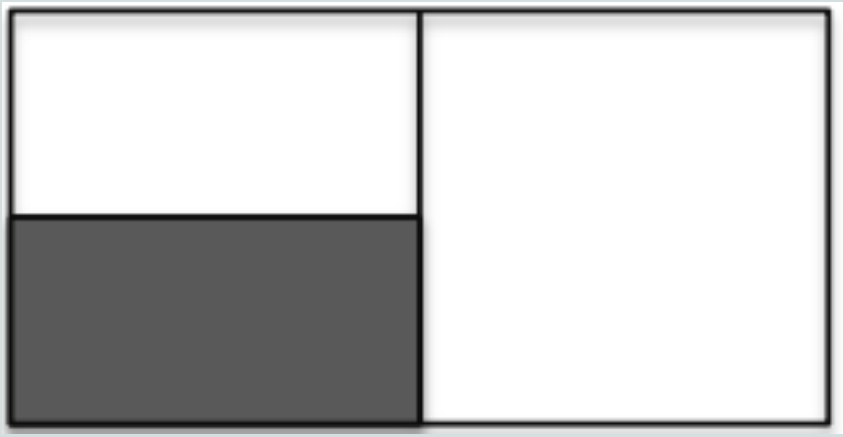
b.



What do students have to do to solve these problems?
What does this tell you about their understanding?

What do students understand?

If the rectangle below represents a brownie, write a fraction to show how much of the brownie is shaded.



How might a student solve this problem?
What does a student understand if they answer ⅓?
What does a student understand if they answer ¼?

Equal Sharing Problems

- Way to introduce and build conceptual understanding of fractions
- Addresses multiple content standards
- Afford opportunities for children engage in Mathematical Practices

Strategies for Equal Sharing Problems

- Guiding questions to make sense of student strategies
  - Represent every share?
  - Create equal shares and use everything?
  - Use fraction terms to describe parts (in relation to the whole)?
  - Notate fractional amounts symbolically?
  - Combine unit fractions for a final share?

Solve It!

If you were a student, how would you solve this problem?

On a field trip to the museum, 12 kids were given 16 pizzas to share equally. How much should each kid get?

Types of Strategies

<u>Beginning Understanding</u>: Students are not initially thinking about how to partition the shared items with the number of sharers

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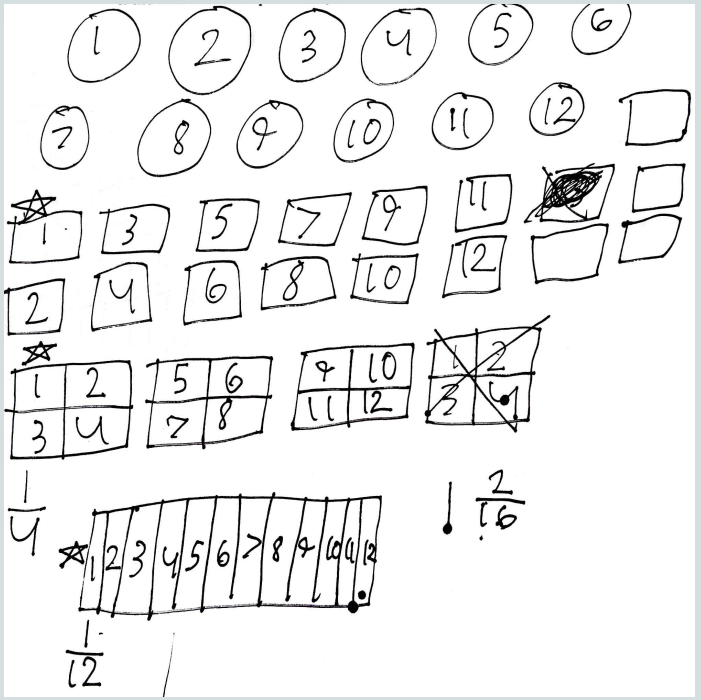
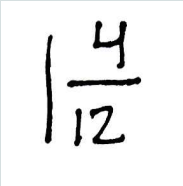
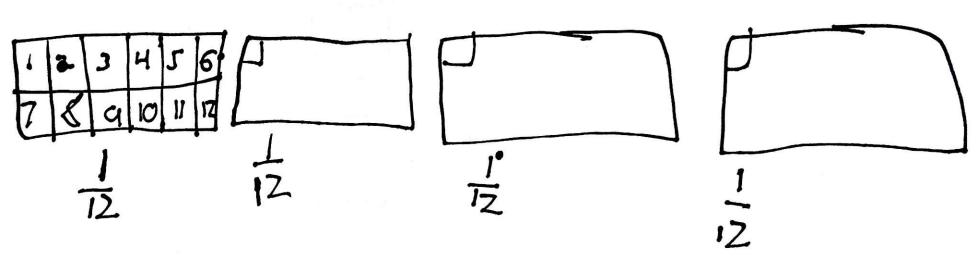


Types of Strategies

<u>Emergent Understanding</u>: Coordination between partitions of shared items with the number of sharers at the beginning of the strategy (additive relationship)

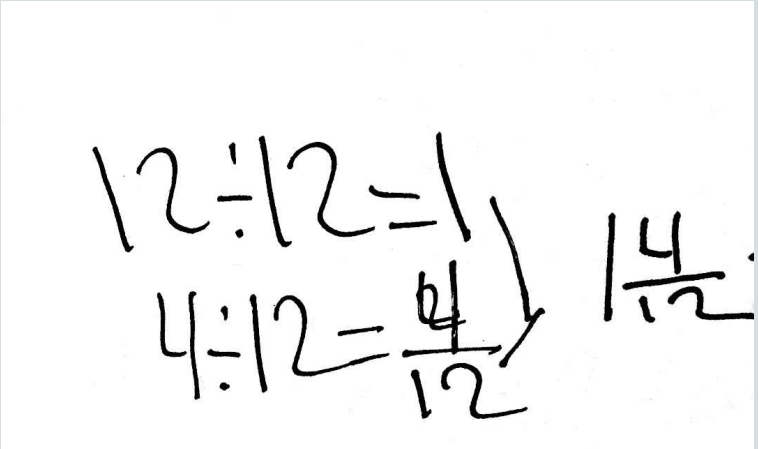




On a field trip to the museum, 12 kids were given 16 pizzas to share equally. How much should each kid get?

Types of Strategies

Advanced Understanding: Coordination between partitions of shared items with the number of sharers at the beginning of the strategy (multiplicative relationship)



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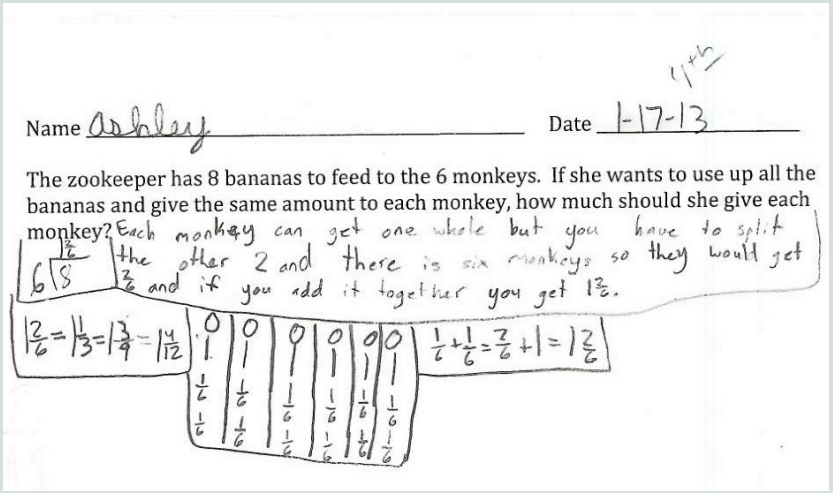
Student Work

Take some time to look over the student work and think about the following questions:

- How does each child solve the problem?
- What does the strategy tell you about the student's understanding?
- Bonus -What other fraction concepts could you address with this student work?

Other Fraction Concepts

Efficiency



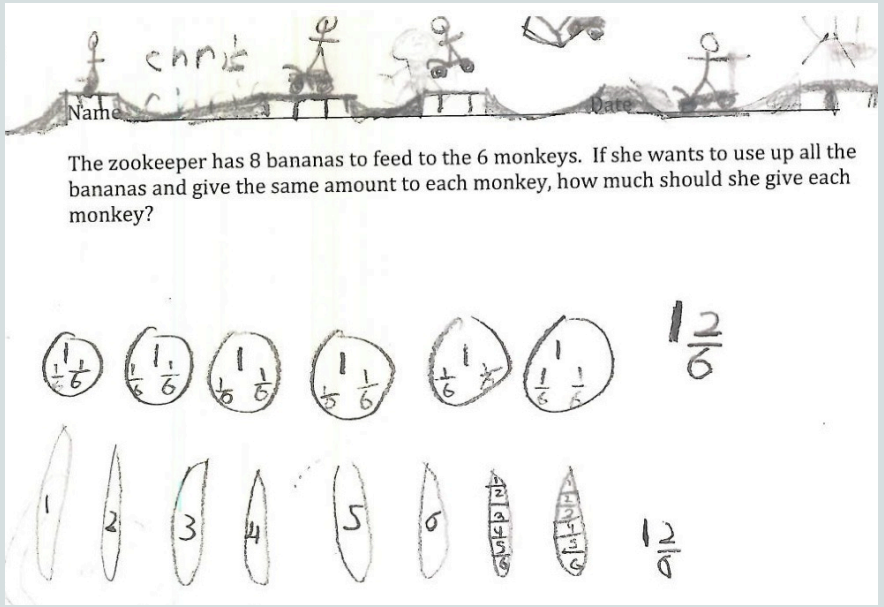
Name Ashley Date 1-17-13

The zookeeper has 8 bananas to feed to the 6 monkeys. If she wants to use up all the bananas and give the same amount to each monkey, how much should she give each monkey? Each monkey can get one whole but you have to split the other 2 and there is six monkeys so they would get 2/6 and if you add it together you get 1 2/6.

$6\overline{)8}$ $1\frac{2}{6}$

$1\frac{2}{6} = 1\frac{1}{3} = 1\frac{4}{12}$

$\frac{1}{6}+\frac{1}{6}=\frac{2}{6}+1=1\frac{2}{6}$



Name Date

The zookeeper has 8 bananas to feed to the 6 monkeys. If she wants to use up all the bananas and give the same amount to each monkey, how much should she give each monkey?

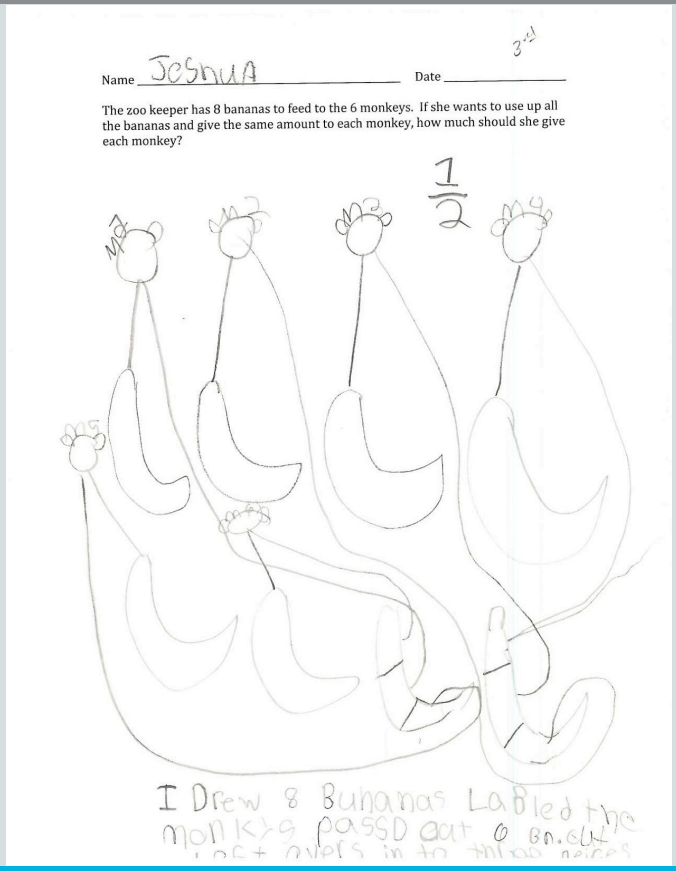
$1\frac{2}{6}$

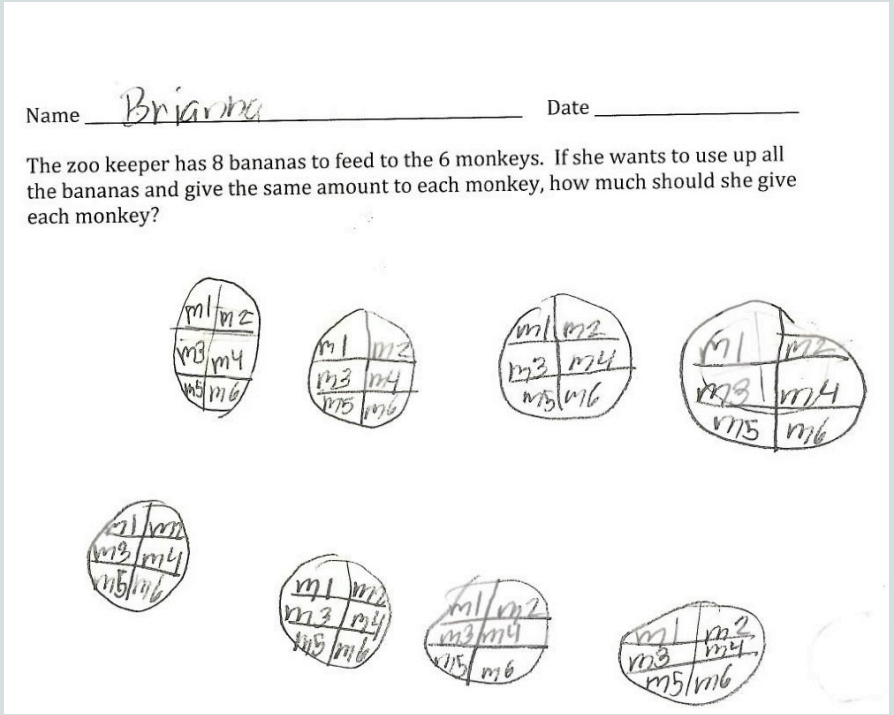
1 2 3 4 5 6

$1\frac{2}{6}$

Other Fraction Concepts

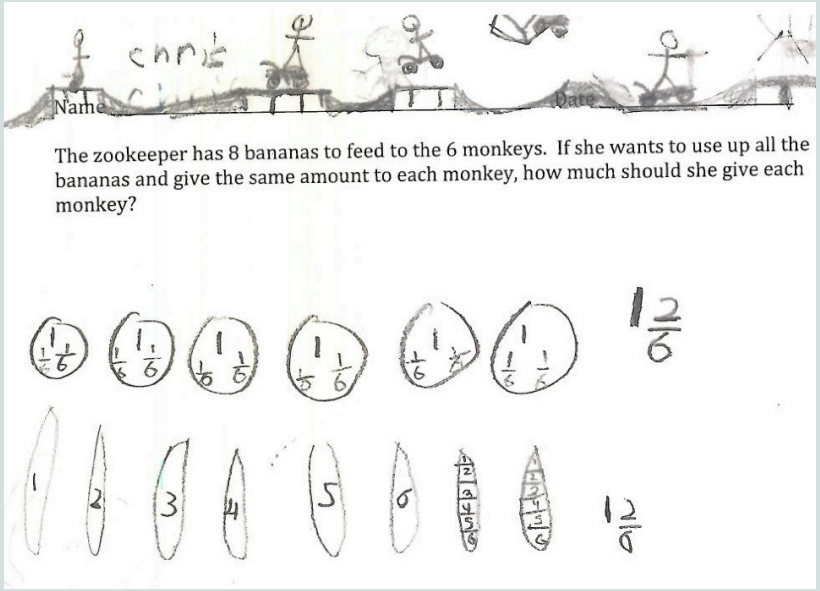
Labeling

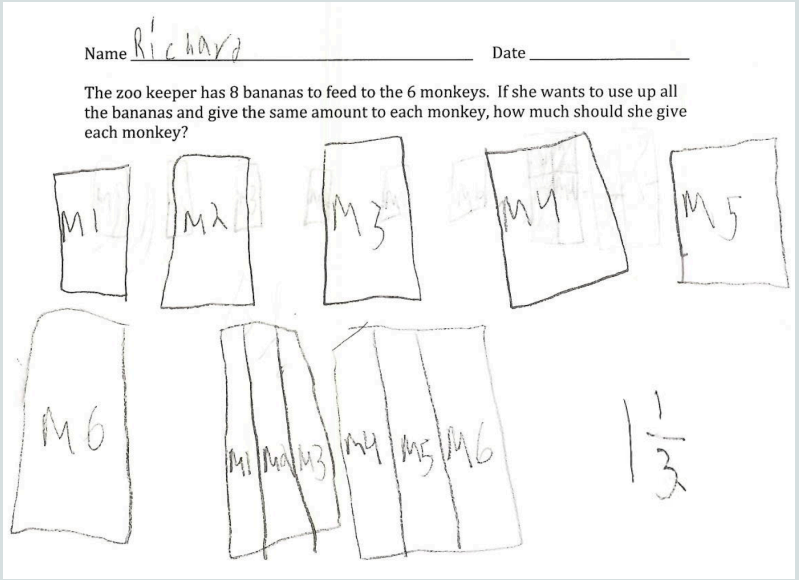




Other Fraction Concepts

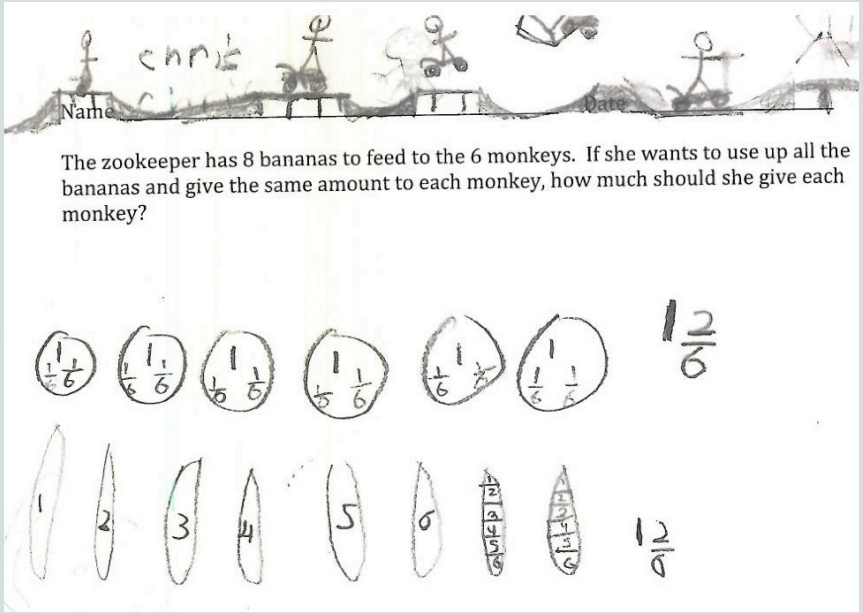
Equivalent Fractions

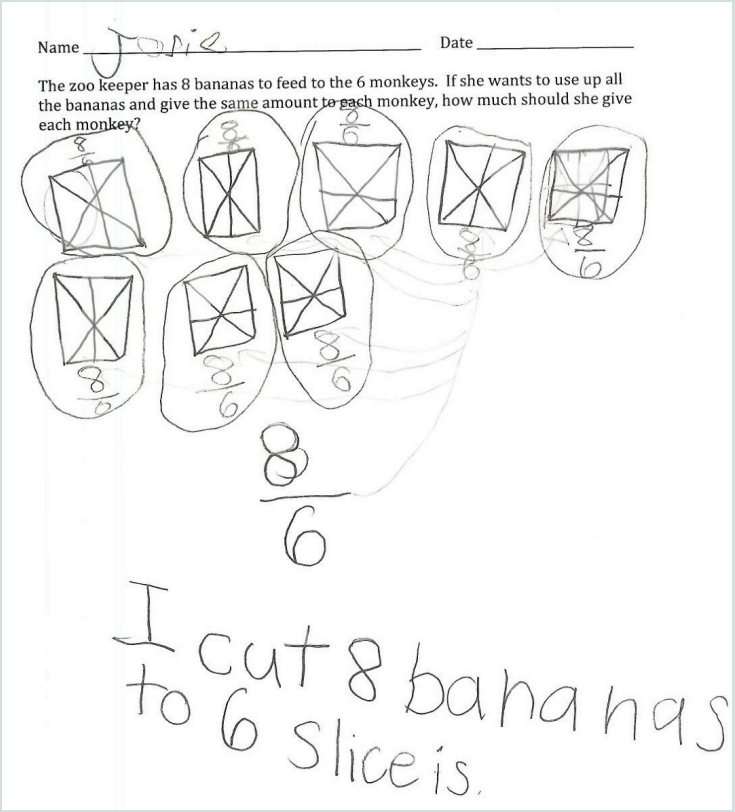




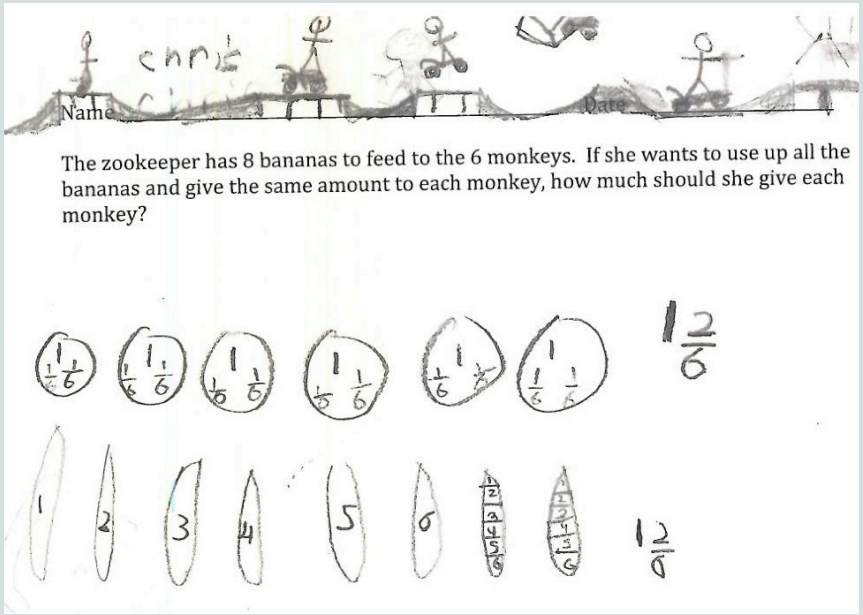
Other Fraction Concepts

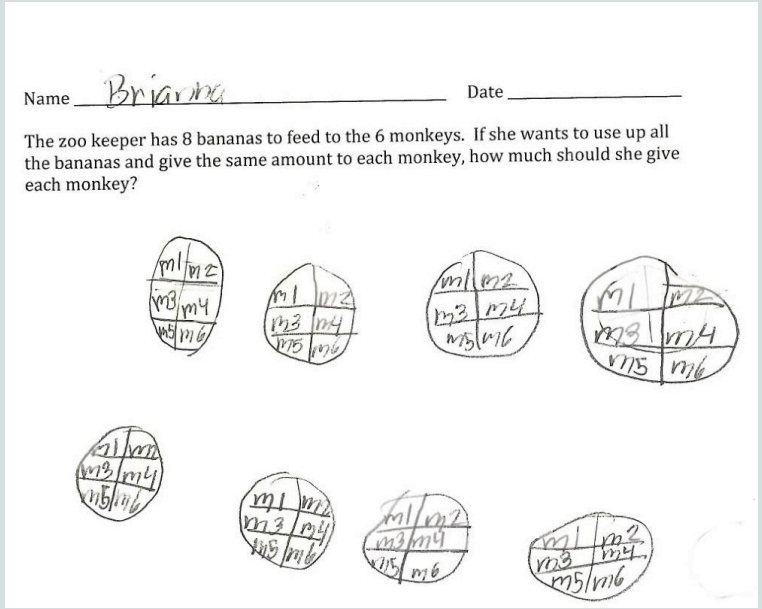
Mixed Numbers and Improper Fractions





Partitioning and Student Understanding



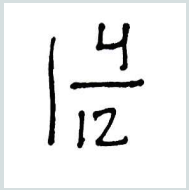


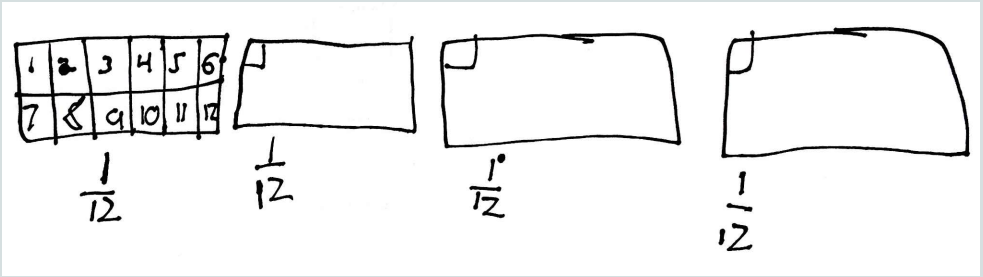
The Power of Equal Sharing

- Way to introduce and build conceptual understanding of fractions
  - Fractions as quantities
  - Wholes can be partitioned into parts
  - Parts are related to wholes
  - Fractions are related to division
- Addresses multiple content standards
  - Efficiency
  - Labeling
  - Equivalent Fractions
  - Mixed Numbers and Improper Fractions
- Afford opportunities for children engage in Mathematical Practices

Relation to CCSS-M

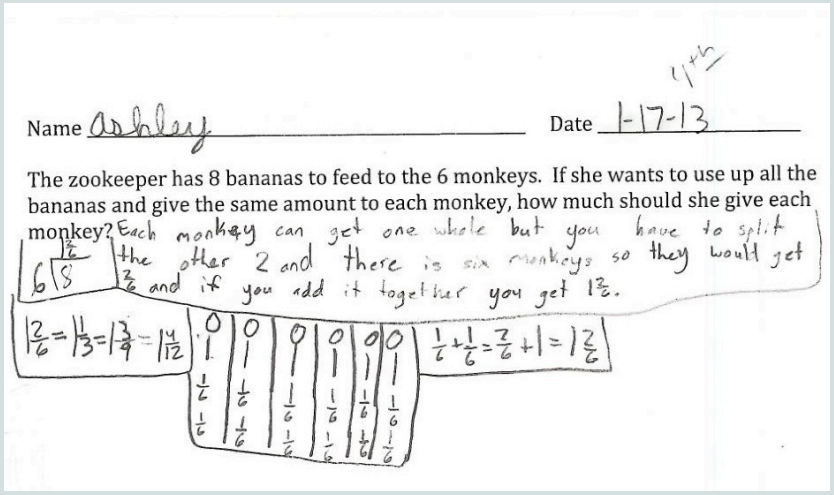
- 3rd Grade
  - 3.NF.1
    - Understand a fraction 1/b as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction a/b as the quantity formed by a parts of size 1/b.





Relation to CCSS-M

- 4th Grade
  - 4.NF.3a
    - Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.



Name Ashley Date 1-17-13

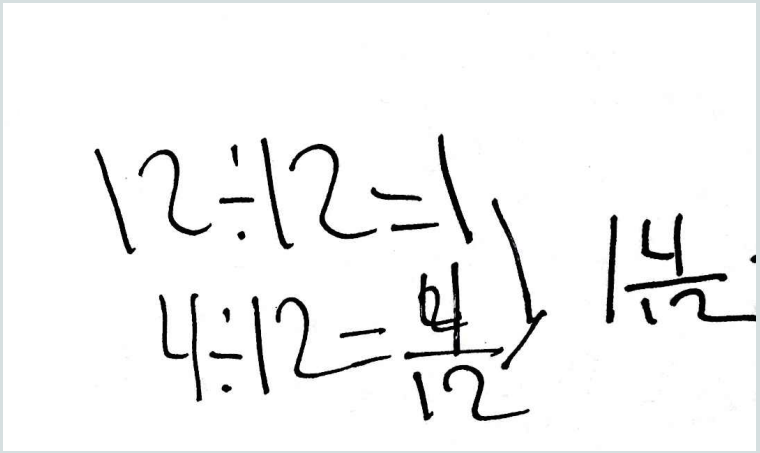
The zookeeper has 8 bananas to feed to the 6 monkeys. If she wants to use up all the bananas and give the same amount to each monkey, how much should she give each monkey? Each monkey can get one whole but you have to split the other 2 and there is six monkeys so they would get 1/3 and if you add it together you get 1 2/6.

2/6 = 1/3 = 3/9 = 4/12

1/6 + 1/6 = 2/6 + 1 = 1 2/6

Relation to CCSS-M

- 5th Grade
  - 5.NF.3
    - Interpret a fraction as division of the numerator by the denominator (a/b = a ÷ b)

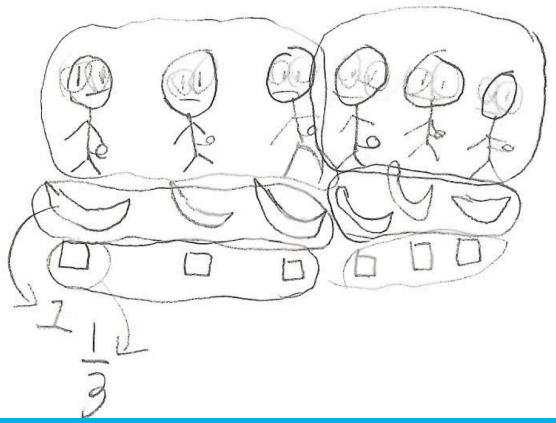


You Try!

How does Brandon solve the problem?
What does his strategy tell us about his understanding?

Name Brandon Date 16

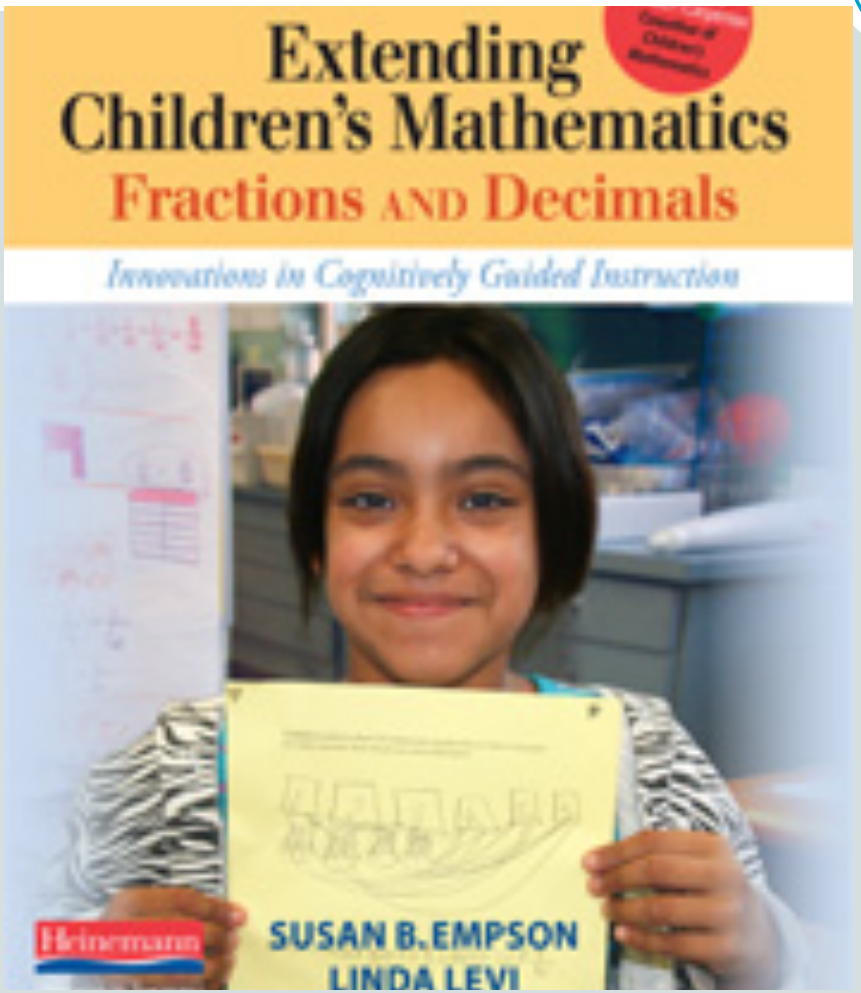
The zoo keeper has 8 bananas to feed to the 6 monkeys. If she wants to use up all the bananas and give the same amount to each monkey, how much should she give each monkey?



Can you tell me how 3 kids could share 5 brownies fairly?

How does Stacey solve the problem?
What does her strategy tell us about her understanding?

Resources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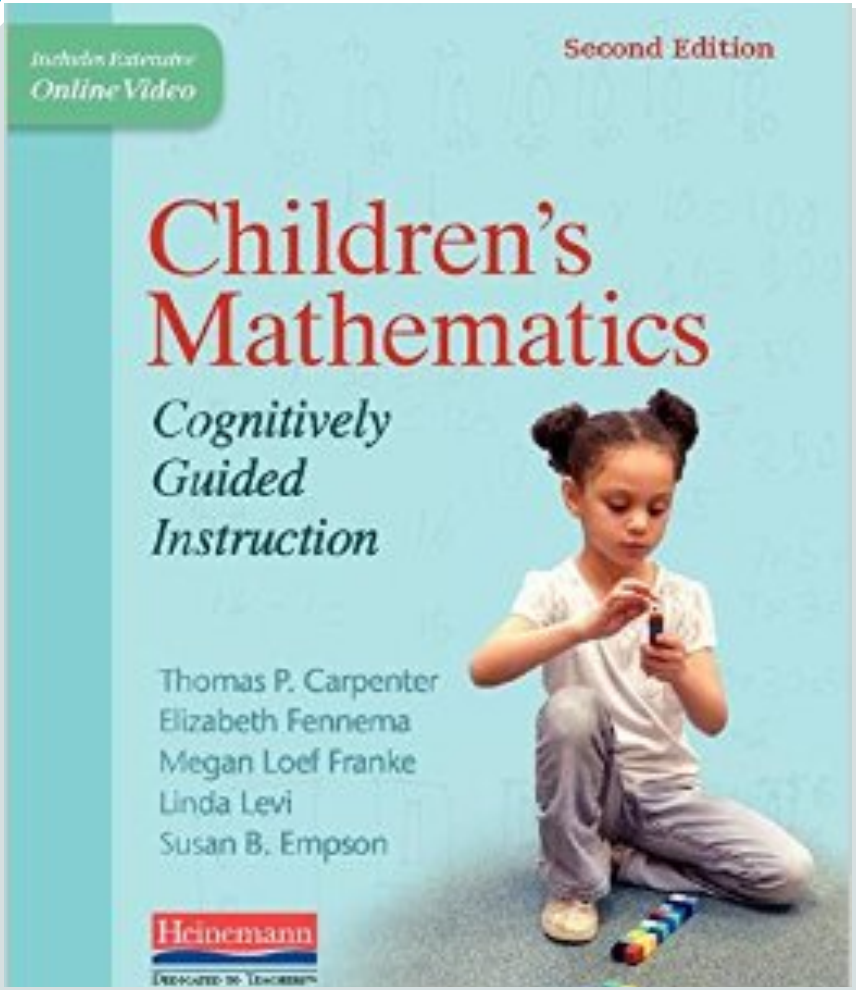
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