

# Fractions ~ Tools, Tasks and Talk!

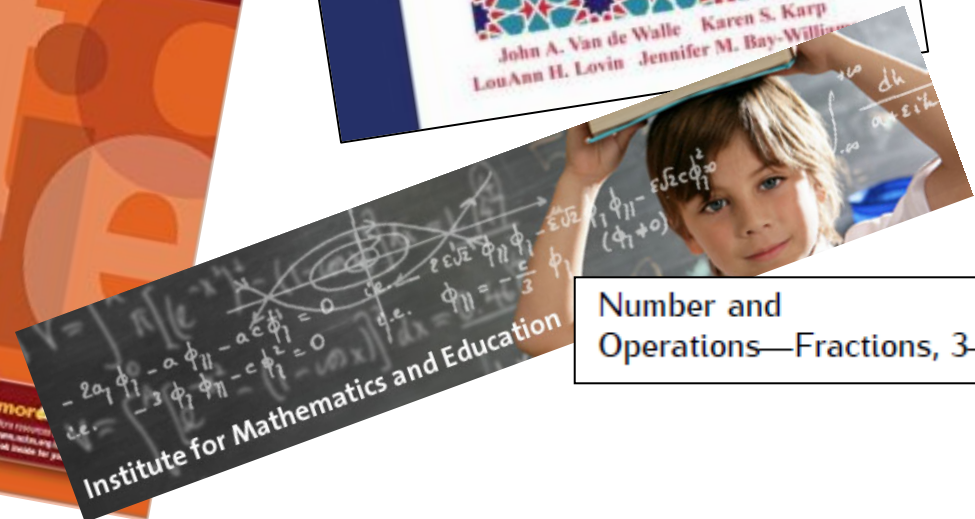
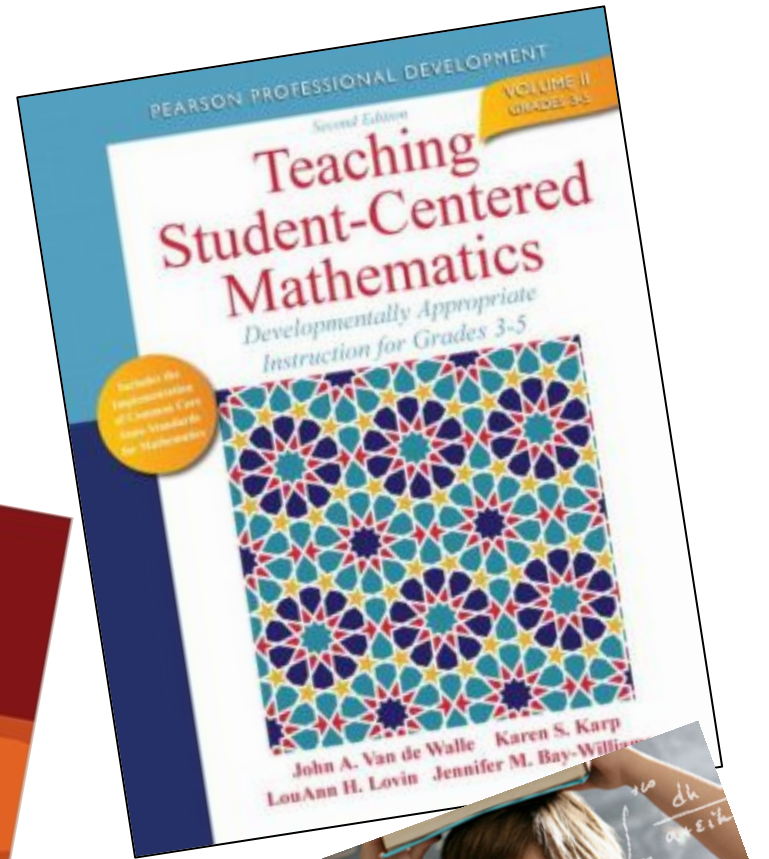
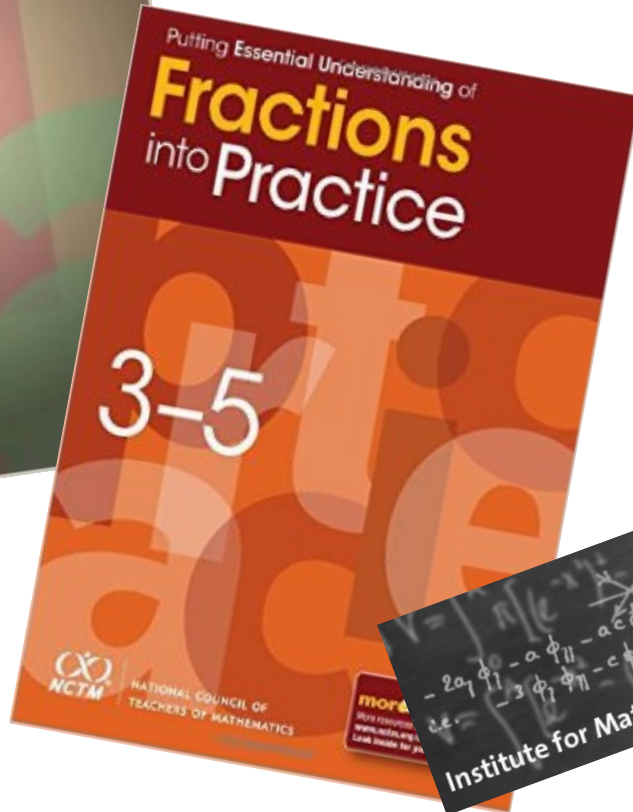
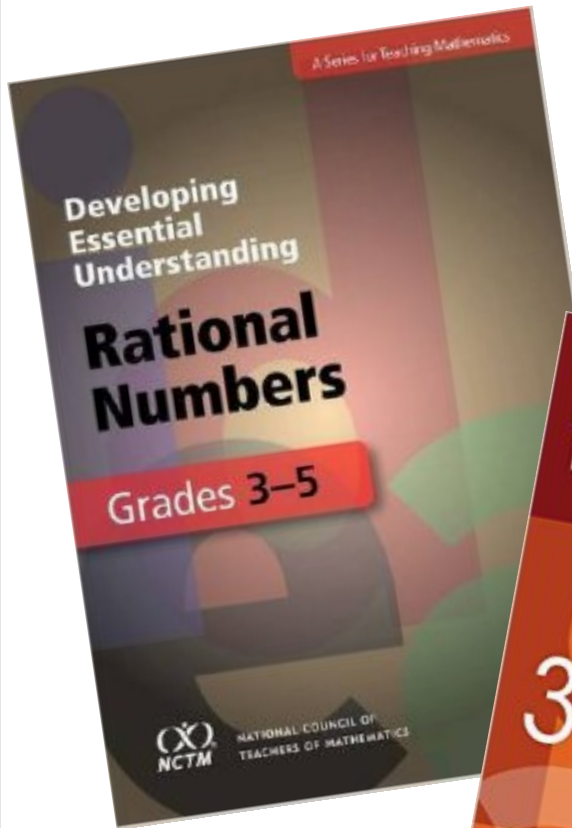
## Making Fractions Make Sense

KSDE 2015

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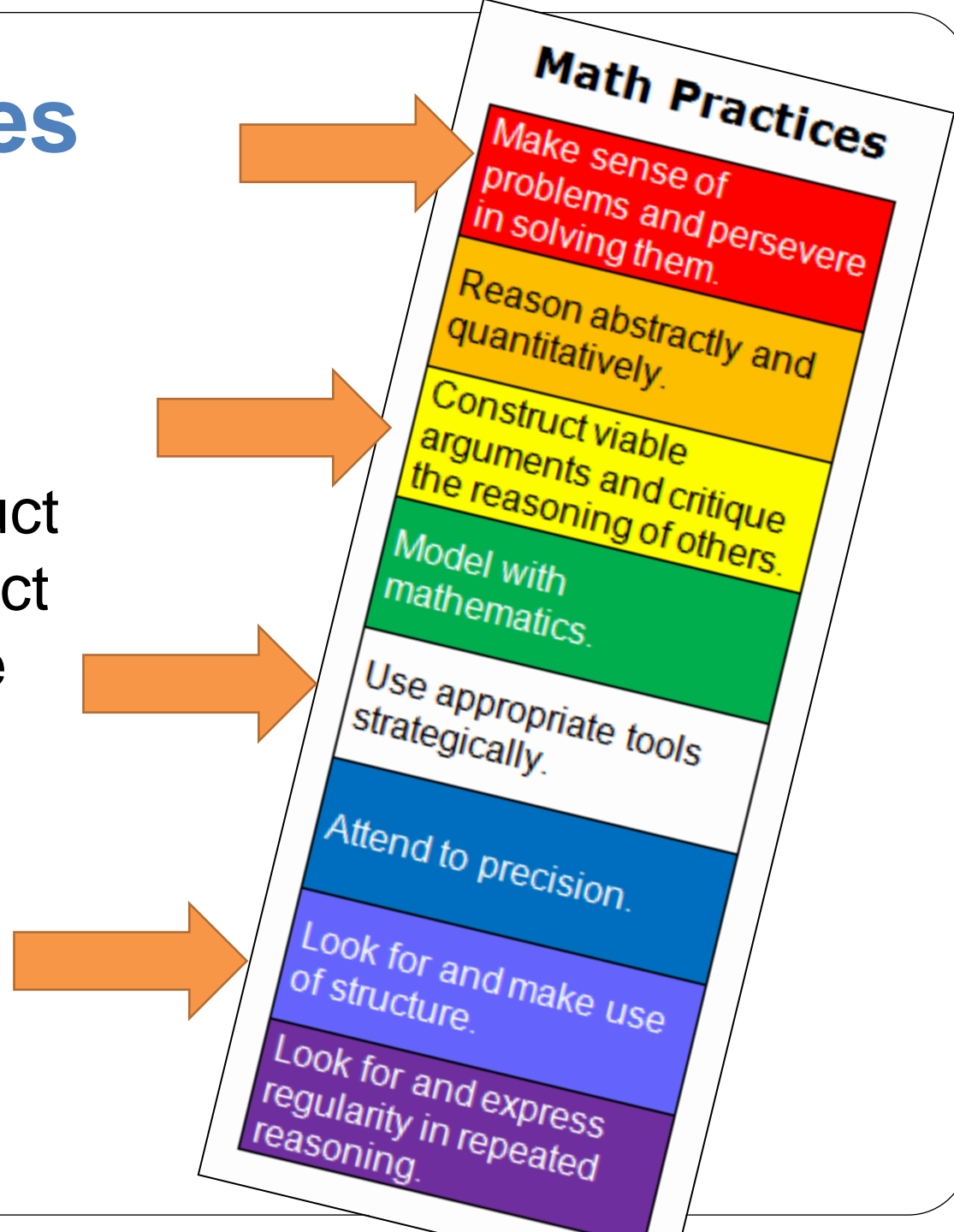
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# Resources Used



# Math Practices

We will touch on various math practices. It is HOW we instruct and HOW we expect students to engage with the mathematics.



# Getting Started . . .

As in teaching about other critical topics in mathematics, teaching about rational numbers requires knowledge that goes “beyond what most teachers experience in standard pre-service mathematics courses.”

“Students must learn mathematics with understanding, actively building new knowledge from experience and prior knowledge.”

~Developing Essential Understanding of Rational Numbers, NCTM, p. 4

# Getting Started . . .

“*Pedagogical Content Knowledge* is specialized content knowledge used to transform understanding of mathematical content into ways of teaching.”

“It is important to consider what is taught and the way in which it is taught.”

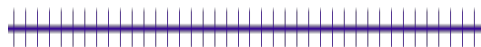
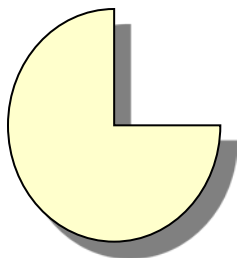
~Putting Essential Understanding of Fractions into Practice, NCTM, p. 1

## Key Ideas about Fraction Number Sense:

- Fractional parts are equal shares of equal-sized portions of a whole.
- Fractional parts have special names that tell how many parts of that size are needed to make a whole.
- The more fractional parts used to make a whole, the smaller the parts.

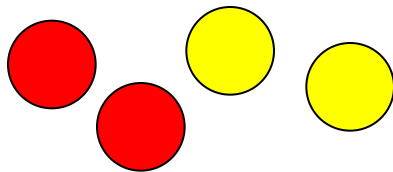
# 3 Models for Fractions

- Region/Area

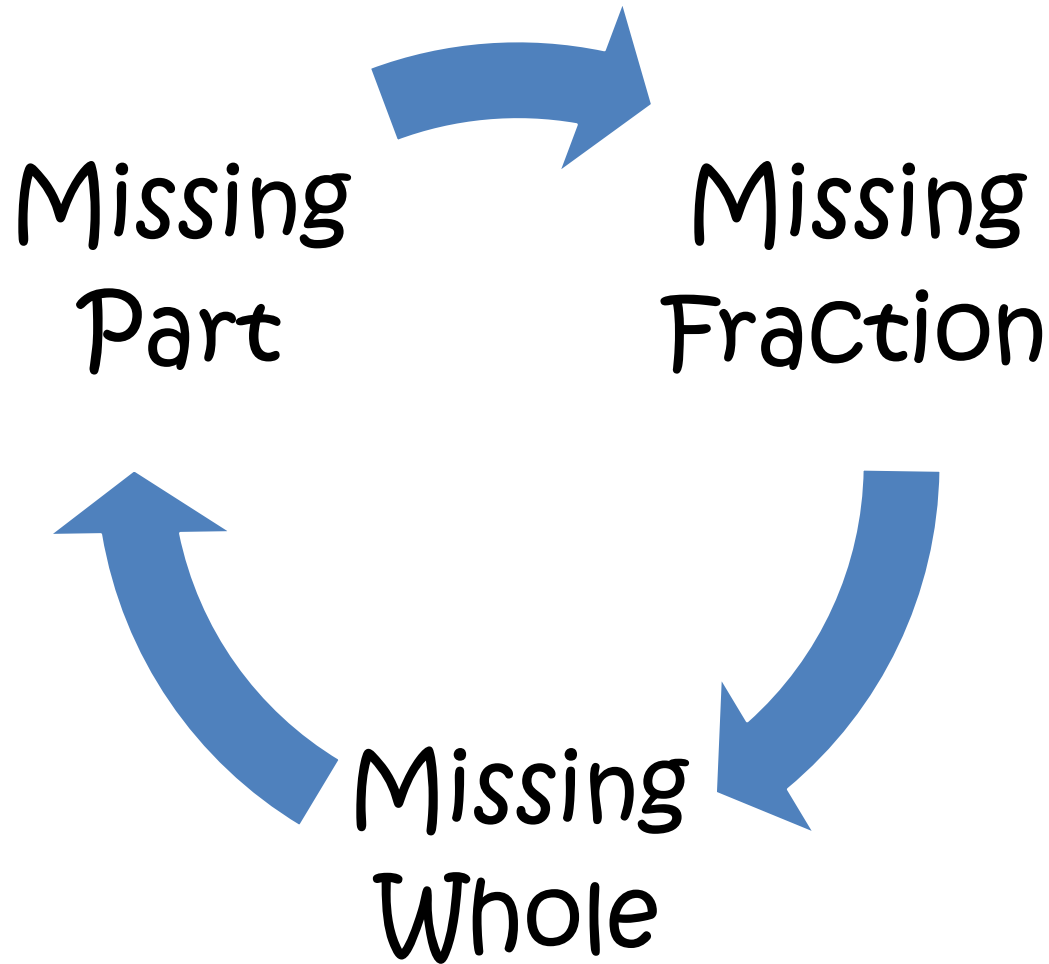


- Length/Measurement

- Sets



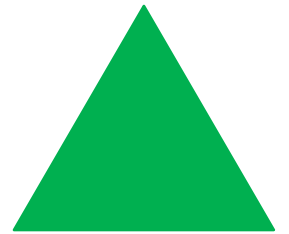
# Part-and-Whole Tasks





# Find the Missing Part

If the trapezoid is one whole,  
which pattern block would be  
one-third?



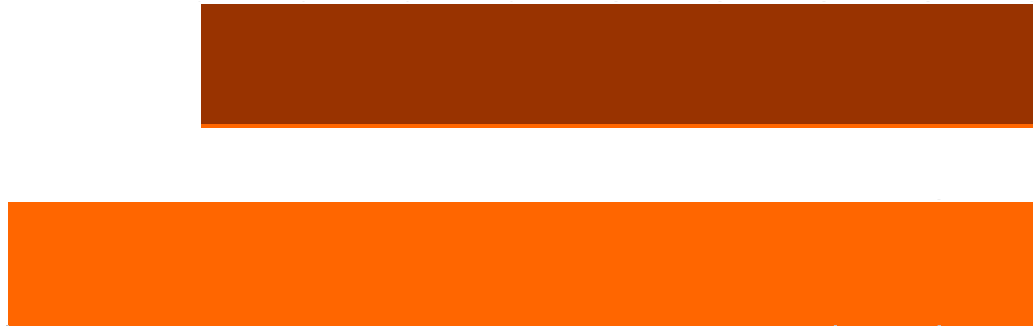
# Find the Missing Part

If dark green is one whole,  
what strip is two-thirds?



# Finding the Missing Fraction

If brown is the whole, what fraction is the orange strip?

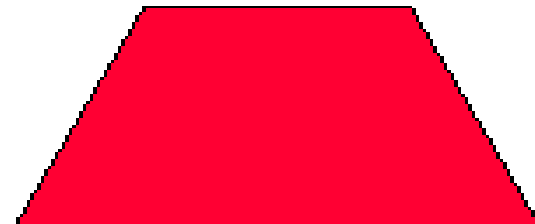


# Find the Missing Fraction

If the rhombus is one whole,  
what fraction does the trapezoid  
represent?

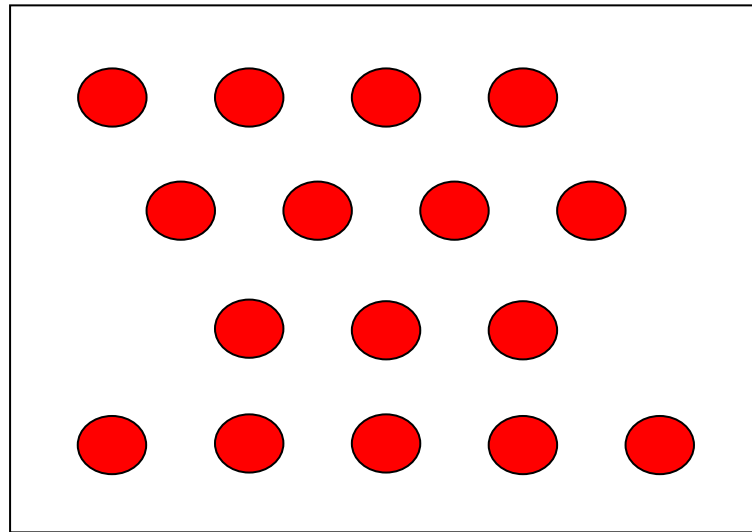


$$1\frac{1}{2}$$



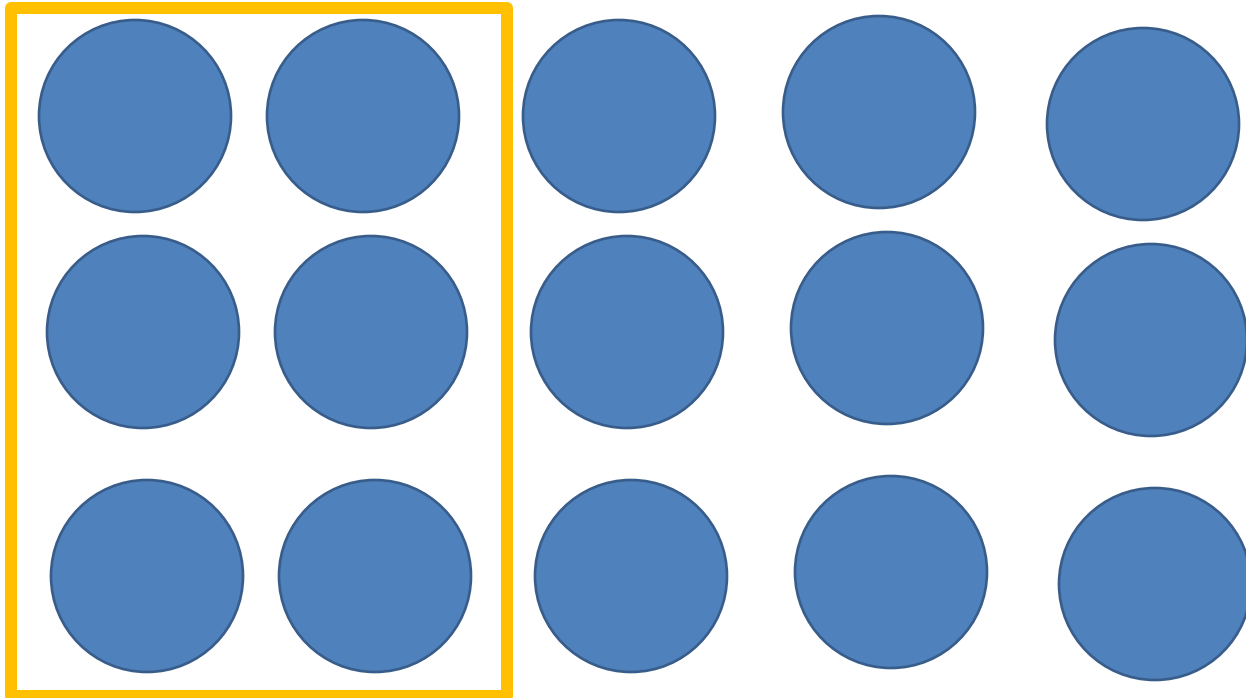
# Finding the Missing Fraction

**These 16 counters are what fraction of a whole set of 12 counters?**



# Find the Missing Whole

If 15 counters are five-halves of a set, how many counters are in a whole set?



# Finding the Missing Whole

If yellow is five-fourths, what rod is one whole?

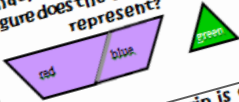


# Now it's Your turn...

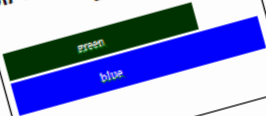
## What is the Fraction?

For each question below, use the appropriate tool to determine your response. Explain your thinking using drawings and/or words.

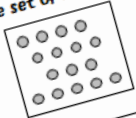
What fraction of the shaded figure does the green triangle represent?



If the dark green strip is one whole, what fraction is the blue strip?



These 16 counters are what fraction of a whole set of 12 counters?



## What is the Part?

For each question below, use the appropriate tool to determine your response. Explain your thinking using drawings and/or words.

Problem	Answer
<p>If brown is the whole, find <u>one-fourth</u>.</p>	
<p>If 9 counters are a whole, how many are in <u>five-thirds</u> of a set?</p>	
<p>If this hexagon is one whole, find <u>one-third</u>.</p>	

## What is the Whole?

For each question below, use the appropriate tool to determine your response. Explain your thinking using drawings and/or words.

If 12 counters are three-fourths of a set, how many counters are in the full set?



If dark green is two-thirds, what strip is the whole?



the red trapezoid is 2-ninths, what could the whole look like?





“Assessment should support the learning of important mathematics and furnish useful information to both teachers and students.” (NCTM, 2000, pg. 22)

Consider the line segment  $AB$  below:



Draw a line segment that is one unit long if line segment  $AB$  represents –

- a.  $\frac{1}{3}$  unit    b.  $\frac{2}{3}$  unit    c.  $1\frac{1}{2}$  units

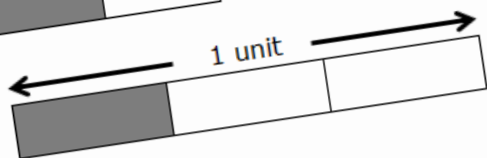
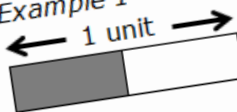
~Developing Essential Understanding of Rational Numbers,  
NCTM, p. 5

## Fraction Tasks

From Developing Essential Understanding of Rational Numbers, NCTM, p. 21

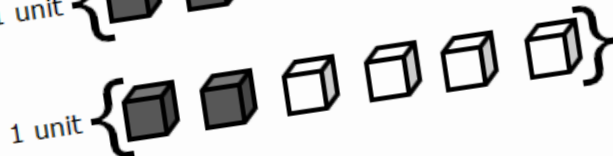
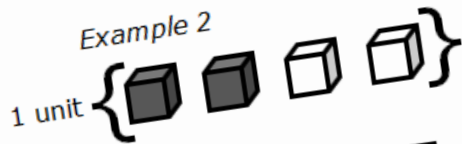
In each example below, which of the two shaded areas represents more?

Example 1



Is there more than one way to think about

Example 2



question? Explain.

## Fraction Tasks

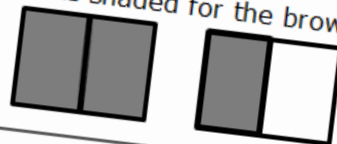
From Putting Essential Understanding of Fractions into Practice, NCTM, p. 33

Read the thinking of the three students for the problem below:

1 brownie



What part is shaded for the brownies below?



Sally - I think  $\frac{3}{4}$  of the two brownies is shaded. The brownies are cut into 4 equal parts and 3 are shaded.

Marcus - I think  $1\frac{1}{2}$  brownies are shaded. One of the brownies is shaded and  $\frac{1}{2}$  of the other brownie is shaded, so  $1\frac{1}{2}$  brownies are shaded.

Demetrius - I think that  $\frac{3}{2}$  of a brownie is shaded. Each brownie is cut in  $\frac{1}{2}$  and 3 of the halves are shaded.

Which student is correct? Explain your thinking.

# Websites to Visit



**Math Learning Progressions**

**Math Tasks and Illustrations**



# How has your understanding grown about these key ideas?

## Key Ideas about Fraction Number Sense:

- Fractional parts are equal shares of equal-sized portions of a whole.
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# Think and Share

Think of a new learning for you and share it with your partner.

Share a new idea you will use with your students.

