Fractions ~ Tools, Tasks and Talk!

Making Fractions Make Sense

NCTM 2015 Boston Conference

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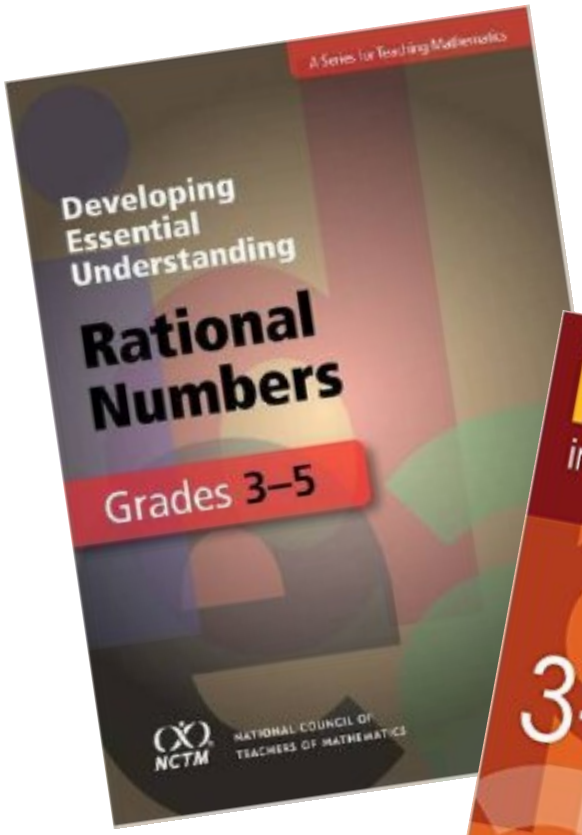
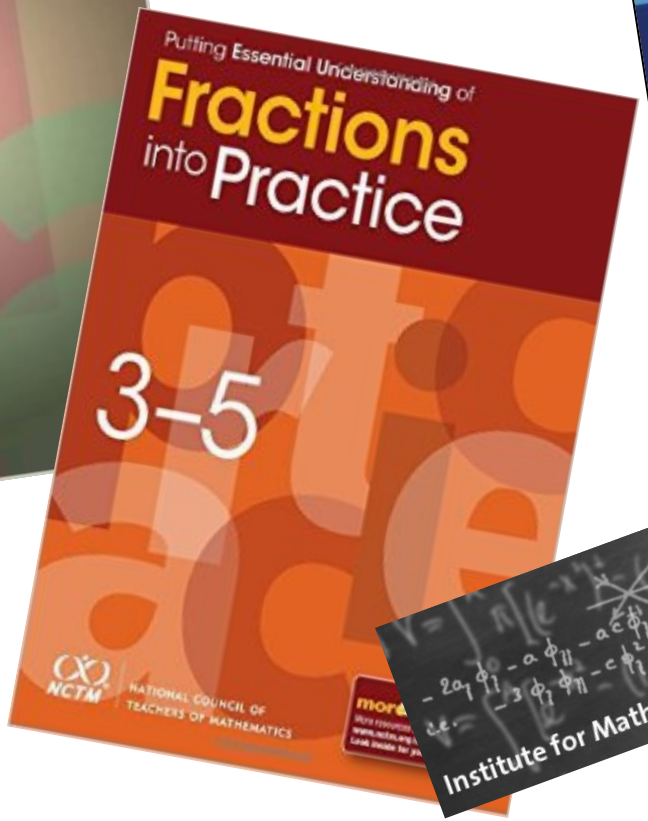
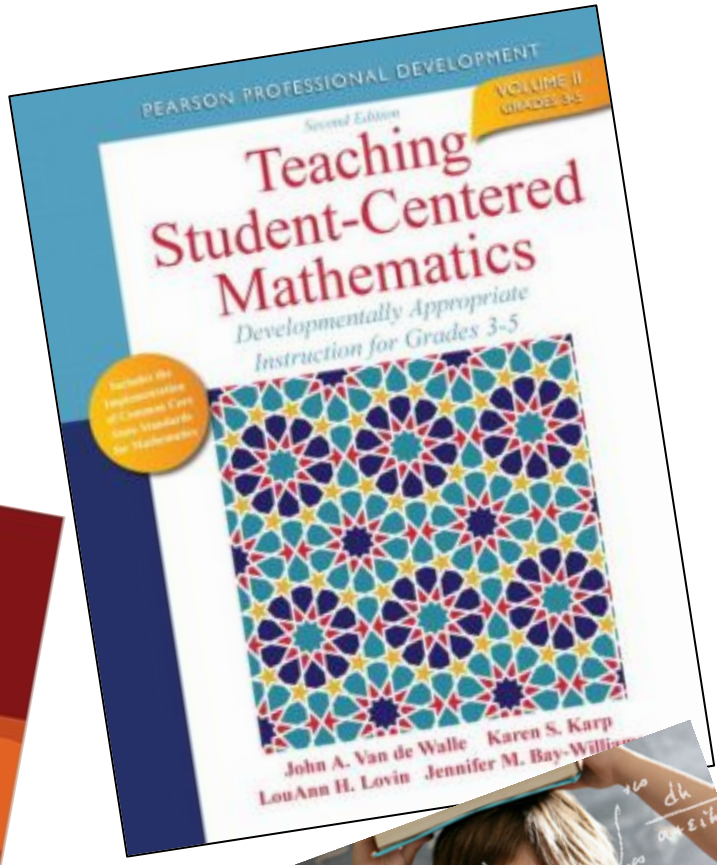
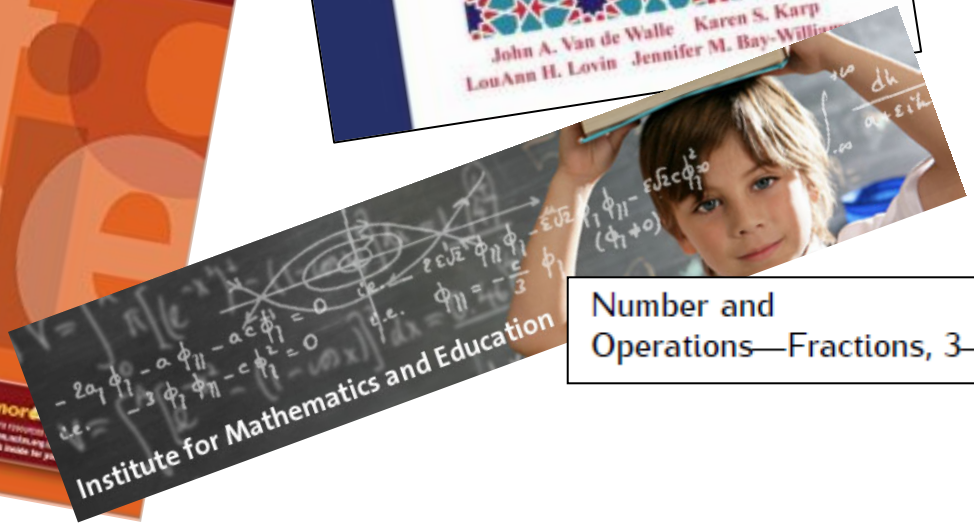
Resources Used





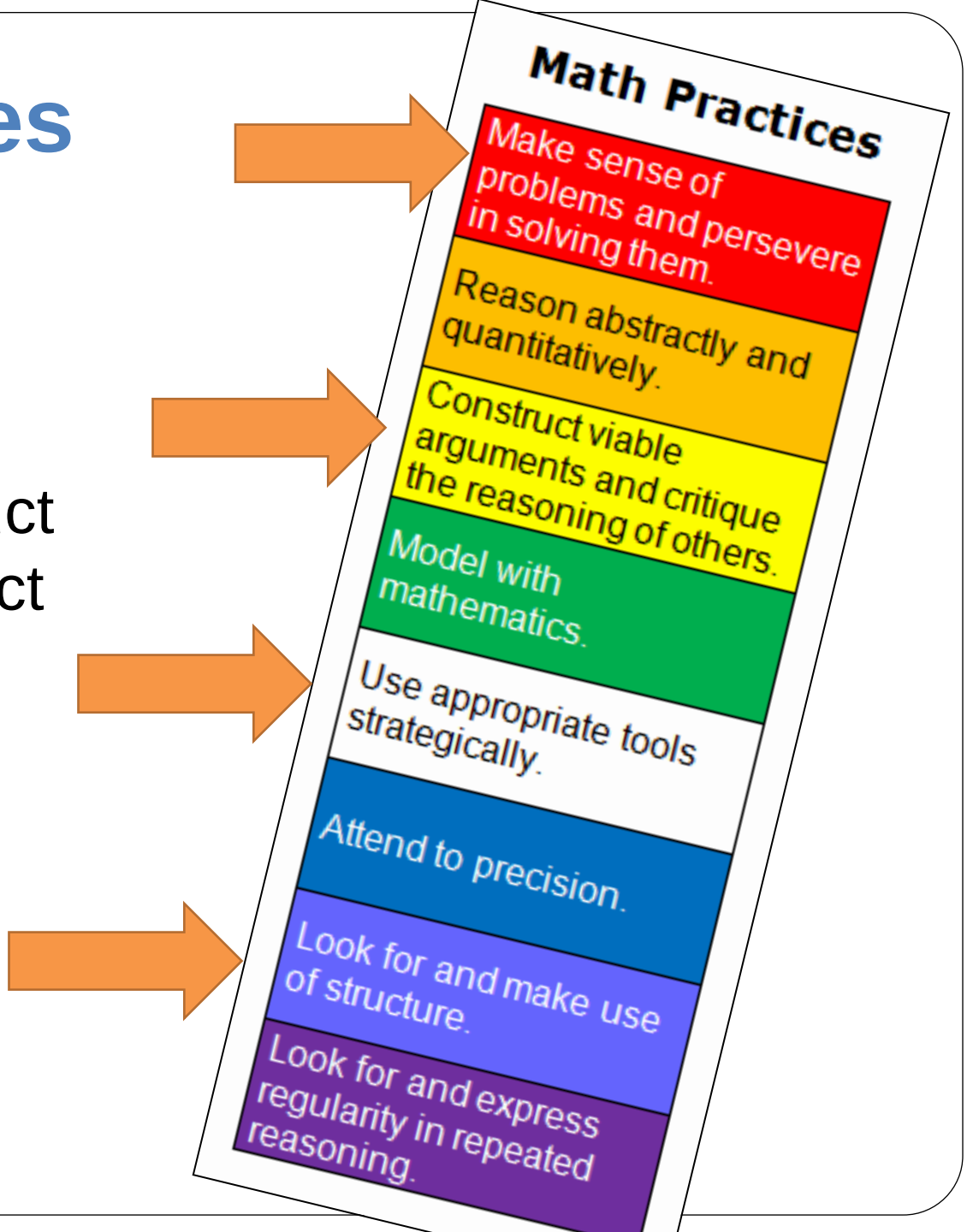




Number and Operations—Fractions, 3–5

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."

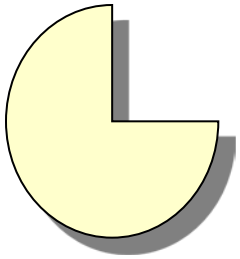
~Putting Essential Understanding of Fractions into Practice, NCTM, p. 1

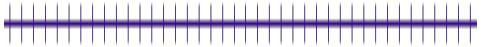
Key Ideas about Fraction Number Sense:

- 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

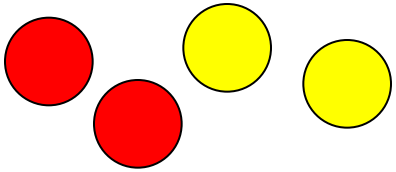
- Region/Area



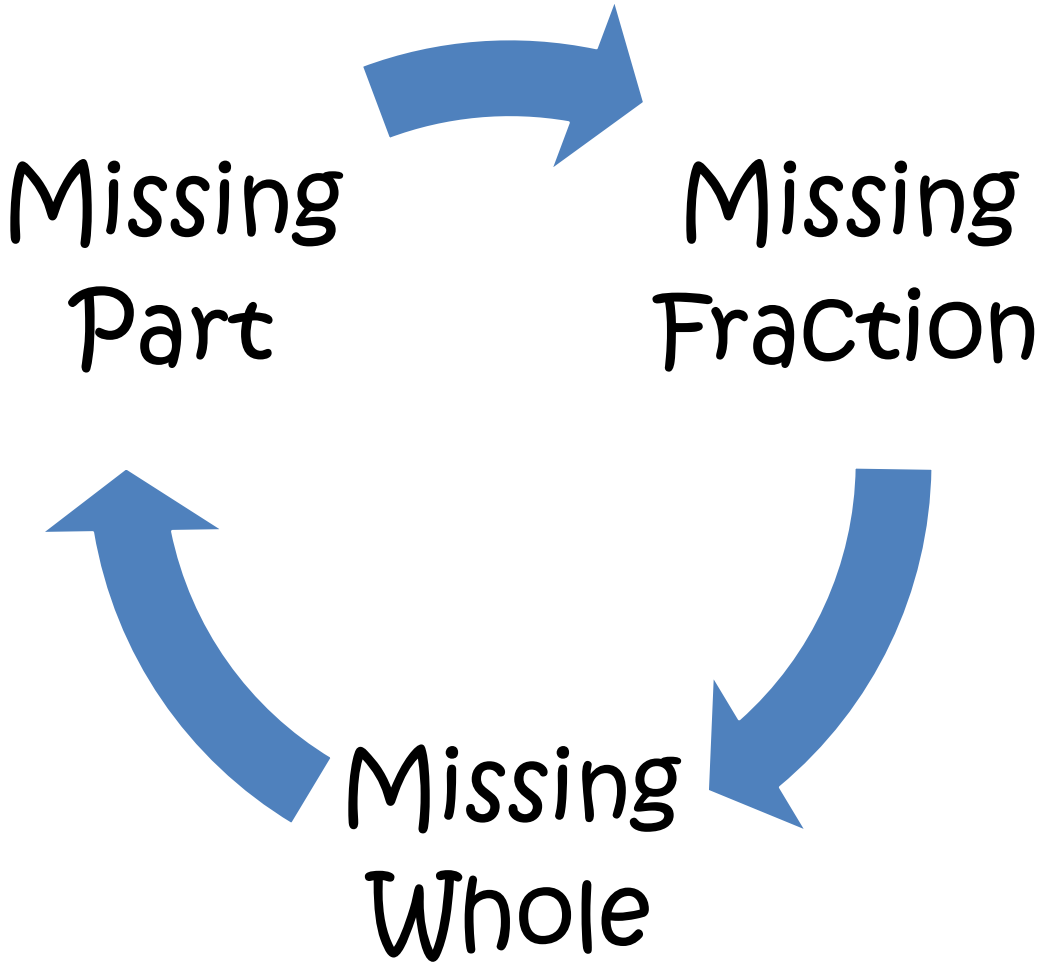


- Length/Measurement

- Sets



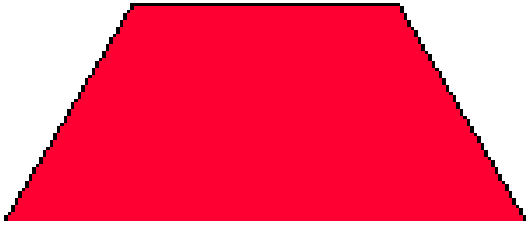
Part-and-Whole Tasks

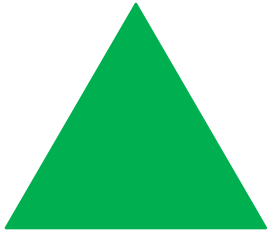


Teaching Student-Centered Mathematics – Dr. John Van de Walle

Find the Missing Part

If the trapezoid is one whole, which pattern block would be <u>one-third</u>?



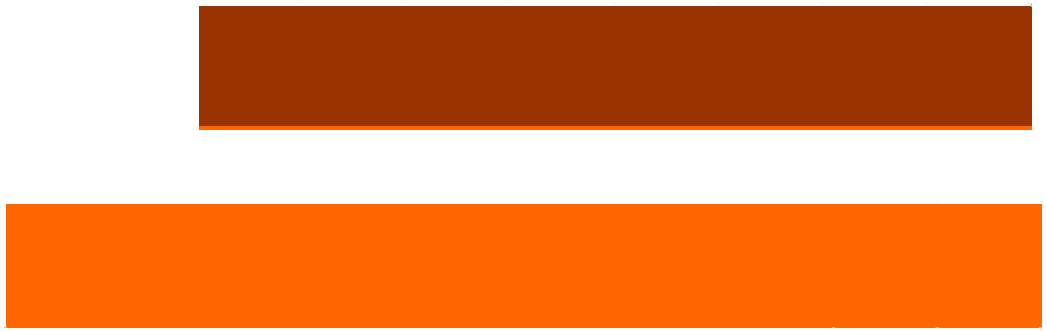


Find the Missing Part

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

Finding the Missing Fraction

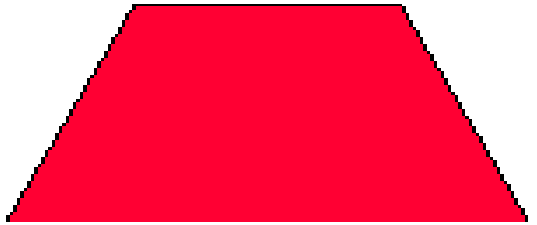
If brown is the whole, what fraction is the orange strip?



Find the Missing Fraction

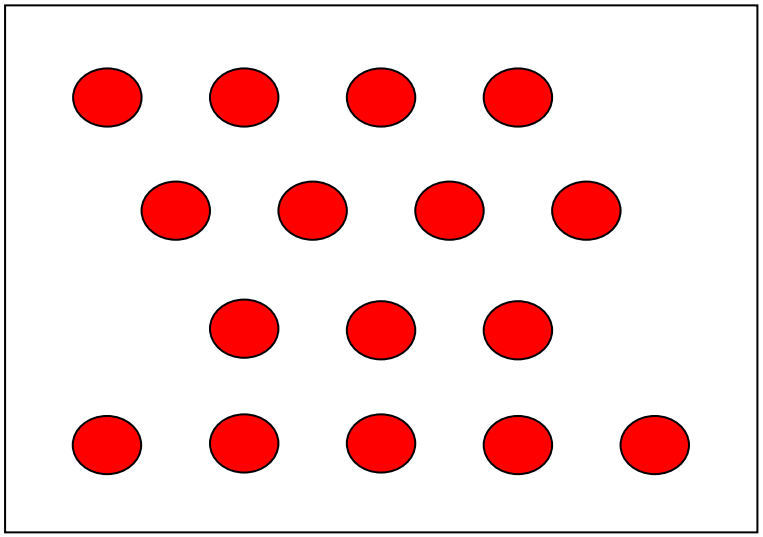
If the rhombus is one whole, what fraction does the trapezoid represent?

$1\frac{1}{2}$



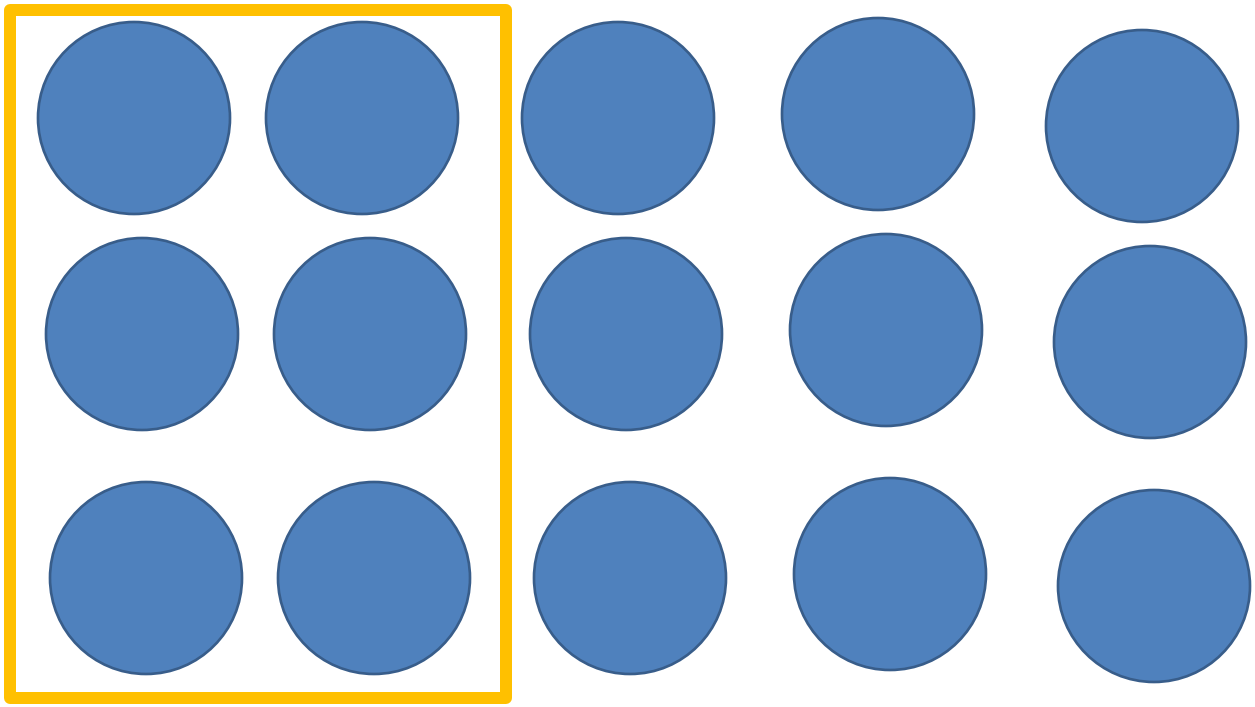
Finding the Missing Fraction

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?

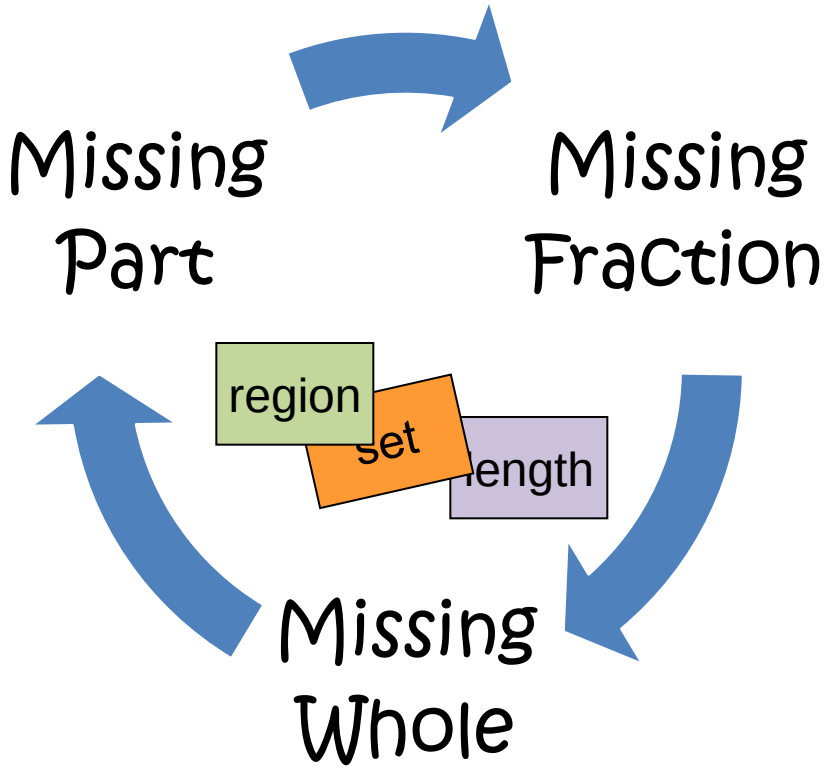


Finding the Missing Whole

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

Task Exploration Time

- Complete at least 1 problem of each color
- Record your thinking
- Have conversation with someone about your solution



"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

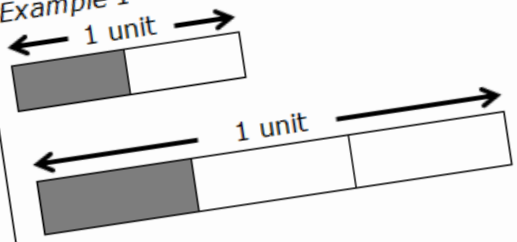
~Developing Essential Understanding of Rational Numbers, NCTM, p. 5

Fraction Tasks

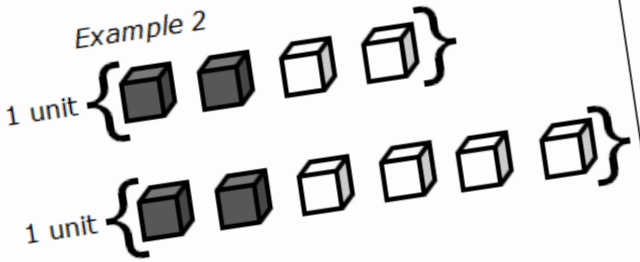
From Developing Essential Understanding of Rational Numbers, NCTM, p. 21

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

Example 1



Example 2



Is there more than one way to think about

uestion? 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 ¾ of the two brownies is shaded. The brownies are cut into 4 equal parts and 3 are shaded.

Marcus – I think 1 ½ brownies are shaded. One of the brownies is shaded and ½ of the other brownie is shaded, so 1 ½ brownies are shaded.

Demetrius – I think that 3/2 of a brownie is shaded. Each brownie is cut in ½ and 3 of the halves are shaded.

Which student is correct? Explain your thinking.

Websites to Visit

Math Learning Progressions

Math Tasks and Illustrations

Illustrative Mathematics

How has your understanding grown about these key ideas?

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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.