Making Friends with Fractions

Academic Excellence PTAC Session

Tuesday
01/10
10:15-11:15 am

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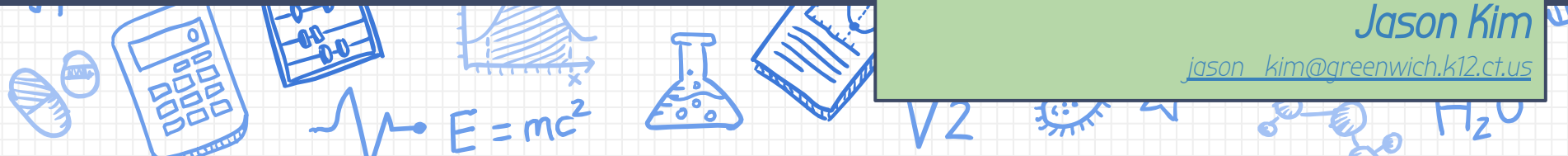


Learning Targets Today

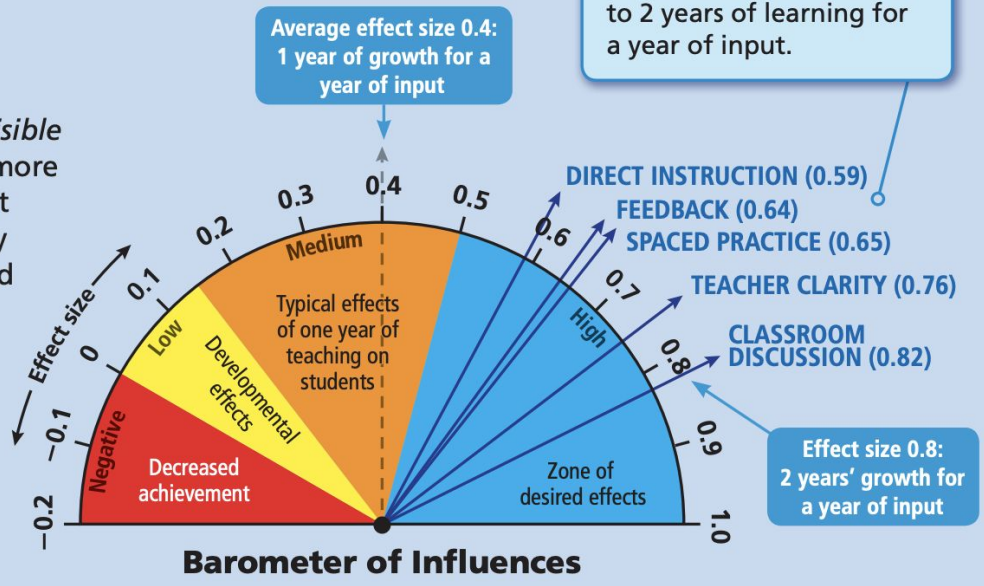
- I understand the importance of visual models.
- I can support my child with seeing fractions as numbers and how to compare them.
- I understand that my child will learn to use algorithms just like I did.

Why Big Ideas Math?

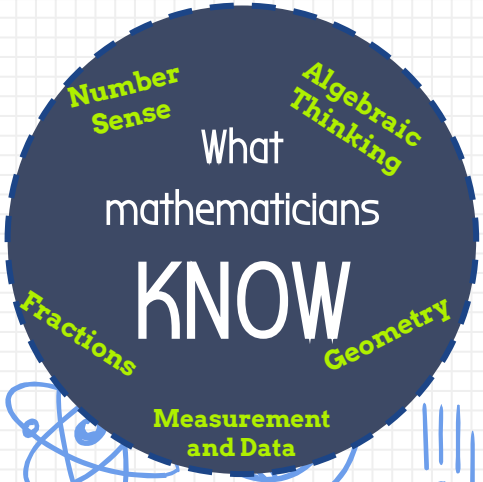
Embedded in every lesson!

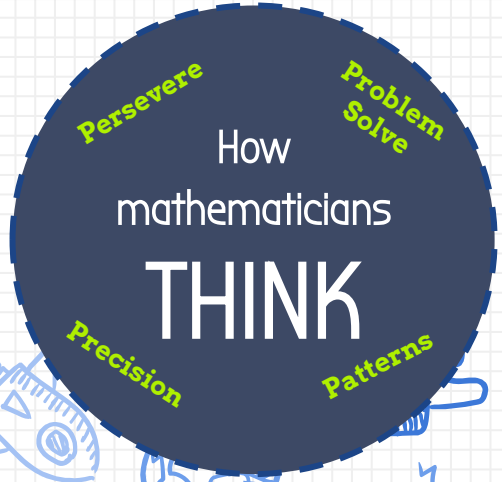
Five Strategies for Purposeful Focus

Professor John Hattie, in his *Visible Learning* network, identified more than 250 influences on student learning, and developed a way of ranking them. He conducted meta-analyses and compared the influences by their **effect size**—the impact the factor had on student learning.



How your student learns math





CT Core Standards

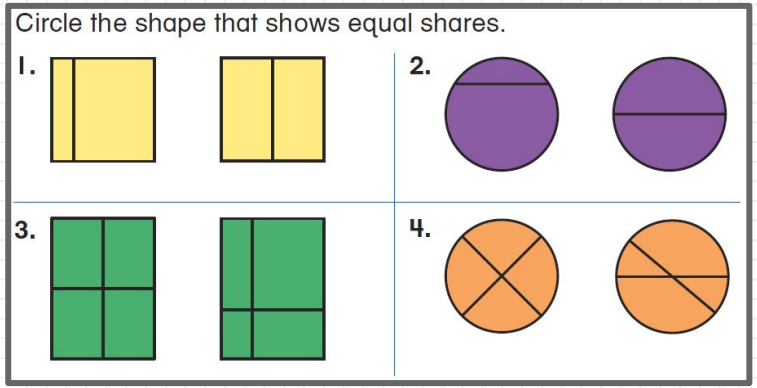
Mathematical Standards of Practice

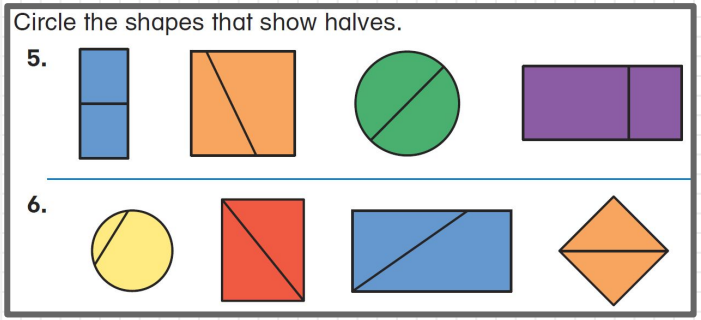
Grade 1 - 4 Fractions

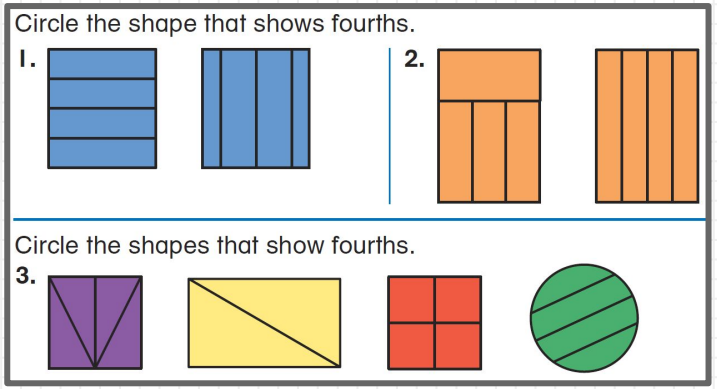
Fraction concepts standards do not exist before Grade 3. We support students in their initial understanding of fractions through **geometry** in Grades 1 and 2.

Grade 1 (Geometry: 1.G.3)

1.G.3: Partition circles and rectangles into two or four equal shares, describe the shares using the words halves, fourths and quarters and use the phrases “half of,” “fourth of,” “quarter of”

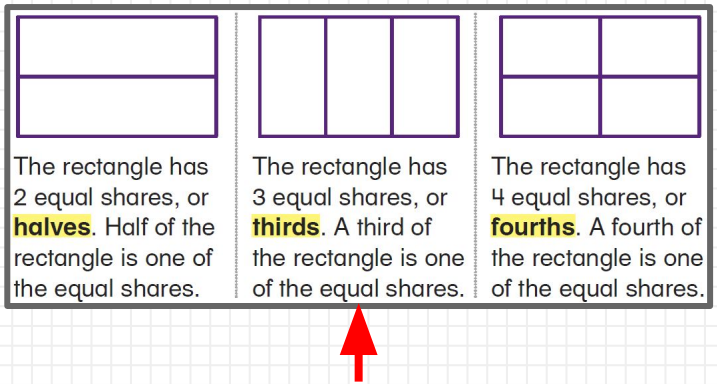






Grade 2 (Geometry: 2.G.3)

2.G.3: Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words: halves, thirds, half of, a third of, etc.



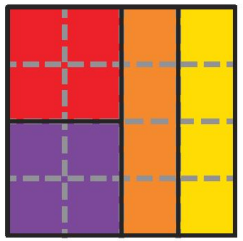
The rectangle has 2 equal shares, or **halves**. Half of the rectangle is one of the equal shares.

The rectangle has 3 equal shares, or **thirds**. A third of the rectangle is one of the equal shares.

The rectangle has 4 equal shares, or **fourths**. A fourth of the rectangle is one of the equal shares.

What's different from Grade 1?
(Thirds and equal vs. congruent)

DIG DEEPER! Explain how you know each color is a fourth of the whole square.

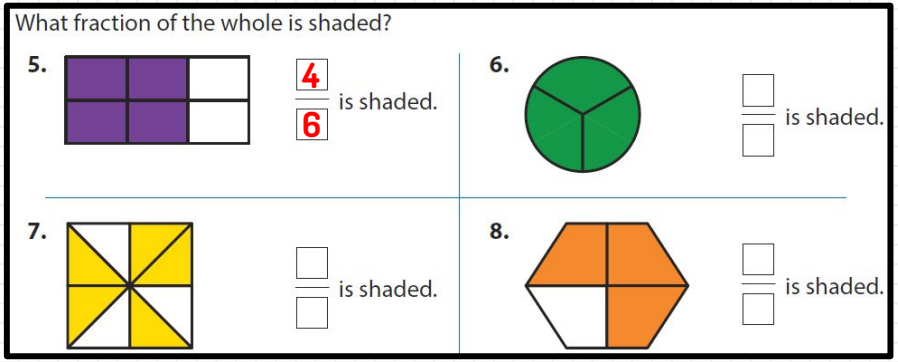


The whole square is divided into 16 smaller squares. Each set of 4 of the 16 is one-fourth of the whole square.

Grade 3 (Fractions: 3.NF.1)

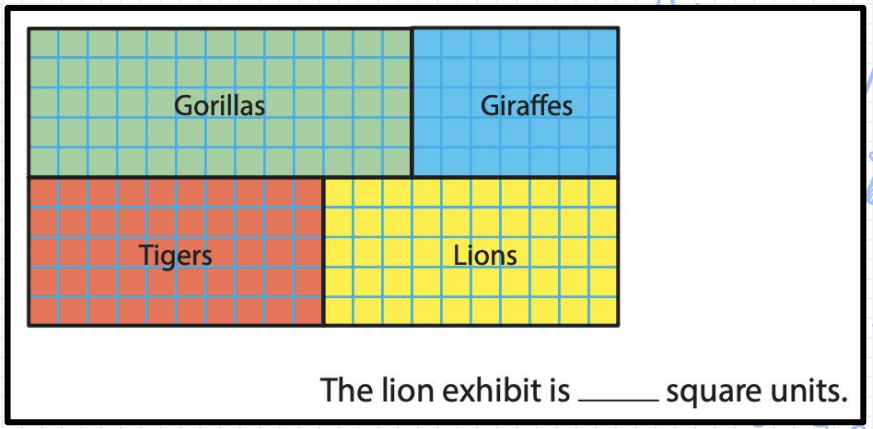
3.NF.1: Understand a fraction 1/b as the quantity formed by 1 part when a whole is partitioned by b equal parts; understand a fraction a/b as the quantity formed by a parts of size 1/b.

Fraction denominators are limited to 2,3,4,6,8



What's different from Grade 2?

(No specific shapes, equal shares now mean area, fourth vs ¼)



One fourth = 1/4

Grade 3 (Geometry: 3.G.2)

3.G.2: Partition shapes into parts with equal shares.

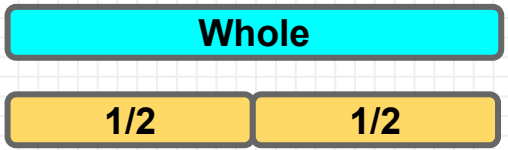
Express the area of each part as a unit fraction of the whole.

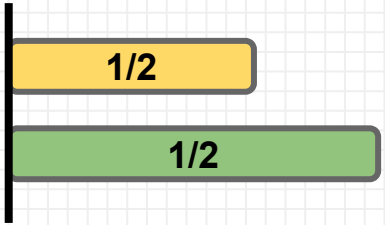
1 whole							
$\frac{1}{2}$				$\frac{1}{2}$			
$\frac{1}{3}$			$\frac{1}{3}$			$\frac{1}{3}$	
$\frac{1}{4}$		$\frac{1}{4}$		$\frac{1}{4}$		$\frac{1}{4}$	
$\frac{1}{6}$	$\frac{1}{6}$		$\frac{1}{6}$		$\frac{1}{6}$		$\frac{1}{6}$
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$

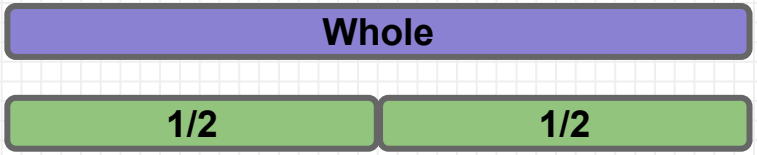
Grade 3

Is a ½ equal to a ½?

It depends on the whole!







SMP6: Attend to Precision

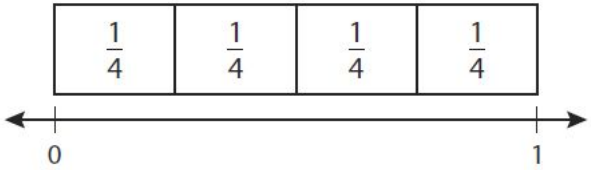
Grade 3 (Fractions: 3.NF.2)

3.NF.2: Represent a fraction 1/b on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line.

Plot the fraction on a number line.

3. $\frac{2}{4}$

____ $\frac{\square}{\square}$s are $\frac{2}{4}$.



4. $\frac{5}{6}$

5. $\frac{2}{3}$

6. $\frac{6}{8}$

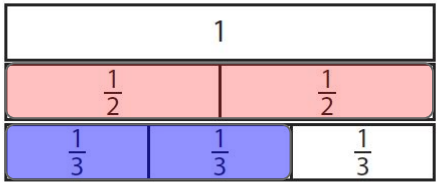
7. $\frac{3}{4}$

Grade 3 (Fractions: 3.NF.3)

3.NF.3: Recognize and generate simple equivalent fractions. Explain why they are equivalent by using a visual model. Understand two fractions as equivalent if they are the same size or the same point on a number line.

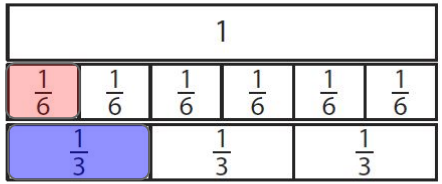
Shade to compare the fractions.

3.



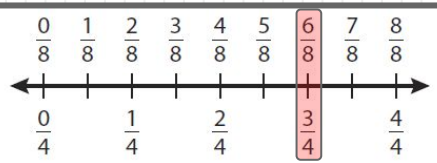
$\frac{2}{2} \bigcirc \frac{2}{3}$

4.



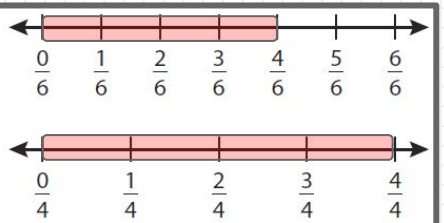
$\frac{1}{6} \bigcirc \frac{1}{3}$

3.



$\frac{3}{4} \bigcirc \frac{6}{8}$

4.



$\frac{4}{6} \bigcirc \frac{4}{4}$

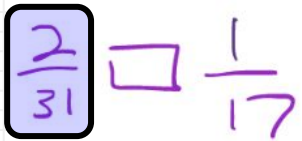
Grade 3 (Fractions: 3.NF.3) Add'l

3.NF.3: Recognize and generate simple equivalent fractions. Explain why they are equivalent by using a visual model. Understand two fractions as equivalent if they are the same size or the same point on a number line.

Compare two fractions with the same numerator or the same denominator by reasoning about their size.

⅖ vs ⅘

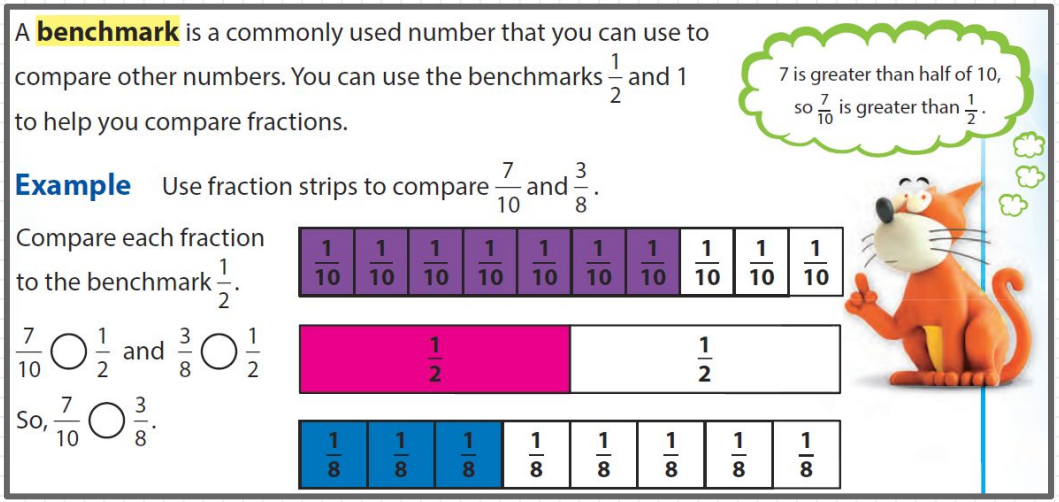
¾ vs ⅜



4.NF.2: Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators.

Grade 4 (Fractions: 4.NF.2)

4.NF.2: Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2.

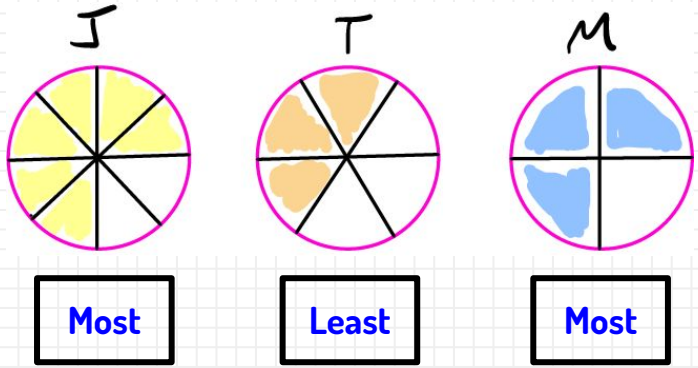


There are more standards, but let's look at some sample problems of what students are asked to solve on a state assessment.

Fun Examples (Grades 3-5)

3.NF.3: Compare fractions with like numerators and denominators

Jason, Tara and Mike each ordered a large pizza. Jason asked to have his pizza cut into 8 equal slices, Tara asked for 6 equal slices and Mike asked for 4 equal slices. If Jason ate 6 slices and Tara and Mike each ate 3 slices, who ate the most pizza? Who ate the least?



$J = \frac{6}{8}$

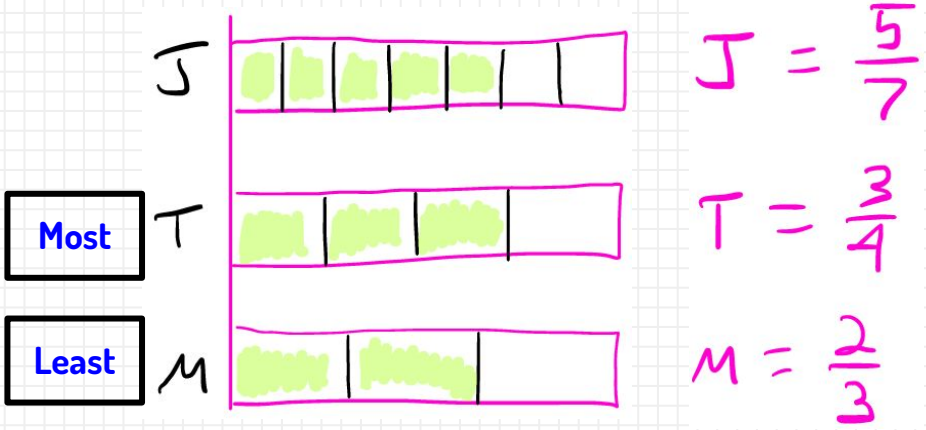
$T = \frac{3}{6}$

$M = \frac{3}{4}$

Fun Examples (Grades 3-5)

4.NF.2: Compare fractions with unlike denominators

Jason, Tara and Mike each earned the same amount of money. Jason saved 5/7, Tara saved 3/4 and Mike saved 2/3 of what he earned. Who saved the most money? Who saved the least money?



Denominator

60	63	56
84	84	84
J	T	M

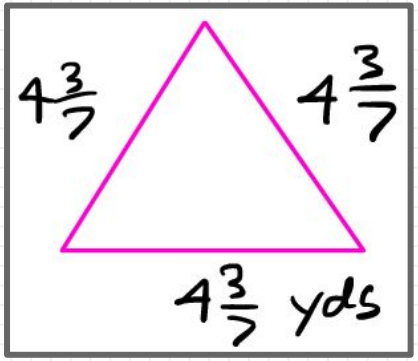
Numerator

30	30	30
42	40	45
J	T	M

Fun Examples (Grades 3-5)

4.NF.3: Add or subtract fractions with like denominators

An equilateral triangle has side lengths 4 3/7 yards. What is the perimeter of the triangle?



$$4\frac{3}{7} + 4\frac{3}{7} + 4\frac{3}{7}$$

$$12 + \frac{9}{7}$$

$$12 + 1\frac{2}{7}$$

$$= 13\frac{2}{7} \text{ yds}$$

Fun Examples (Grades 3-5)

4.NF4: Multiply whole number by fraction

If each gallon of fruit punch needs 3/4 cups of lemonade, how much lemonade is needed to make 4 gallons of fruit punch?

Gallon 1

Gallon 2

Gallon 3

Gallon 4

$$\frac{3}{4} \times \frac{4}{1} = \frac{12}{4} = 3$$

Fun Examples (Grades 3-5)

4.NF.5: Add decimal fractions tenths and hundredths

Tara ran 3.06 miles and Kim ran 2.5 miles. How far did they run altogether?

3 and 6 hundredths + 2 and 5 tenths

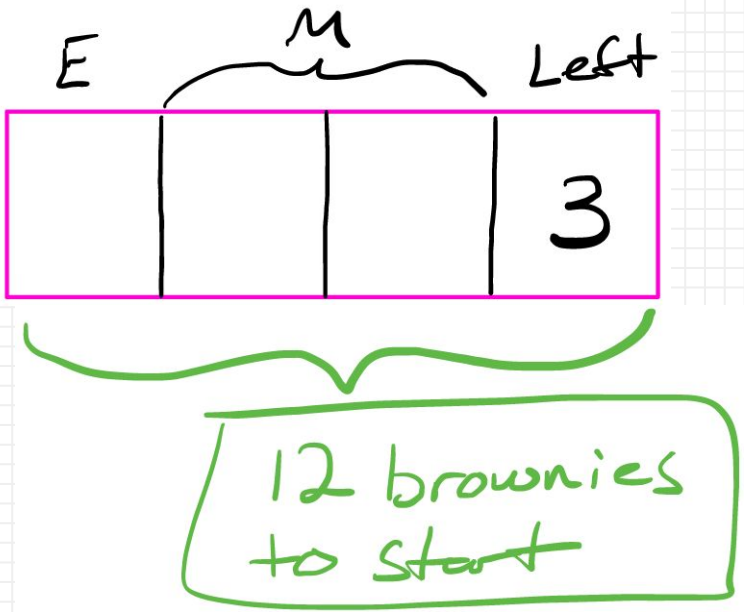
$3\frac{6}{100} + 2\frac{5}{10}$

$3\frac{6}{100} + 2\frac{50}{100} = 5\frac{56}{100} = \boxed{5.56}$

Fun Examples (Grades 3-5)

5.NF.2: Add or subtract fractions with unlike denominators

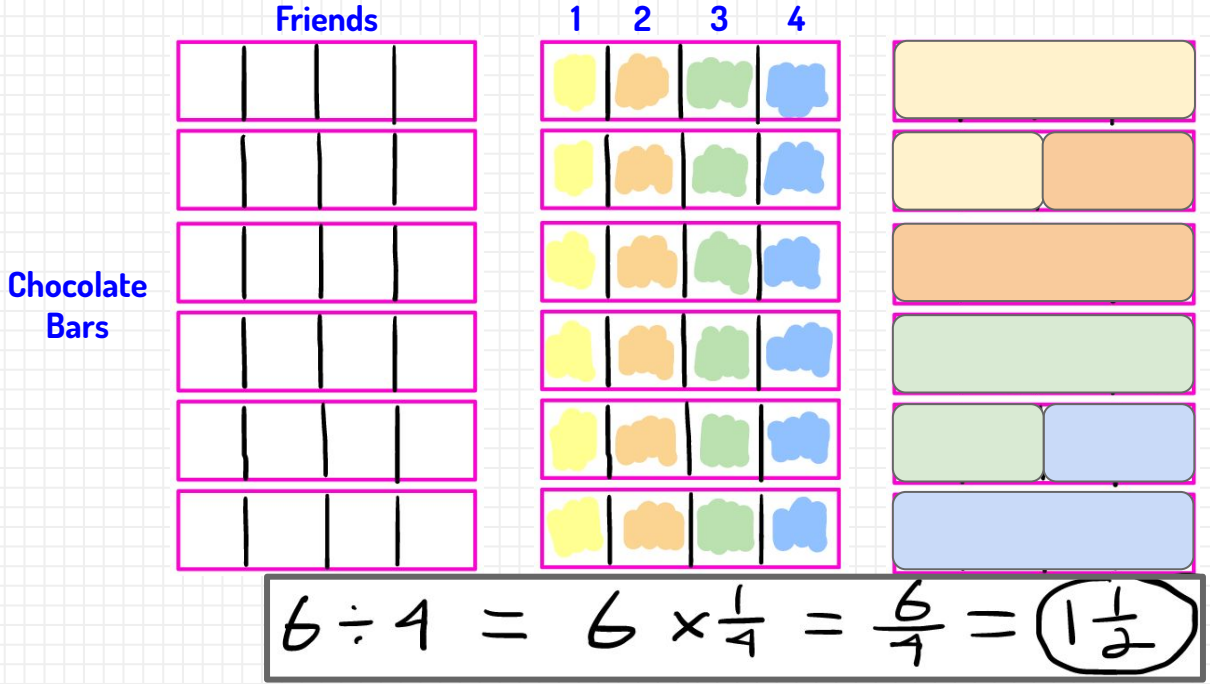
Mike made a tray of brownies for his daughters. Evie ate 1/4 of the brownies and Maggie ate 1/2 of the brownies. If there are 3 brownies left, how many brownies did Mike make?



Fun Examples (Grades 3-5)

5.NF.3: Divide whole number by whole number with fraction answer

Jason has 6 chocolate bars and he shares them equally with 3 friends. How many chocolate bars do each of the 4 students get?

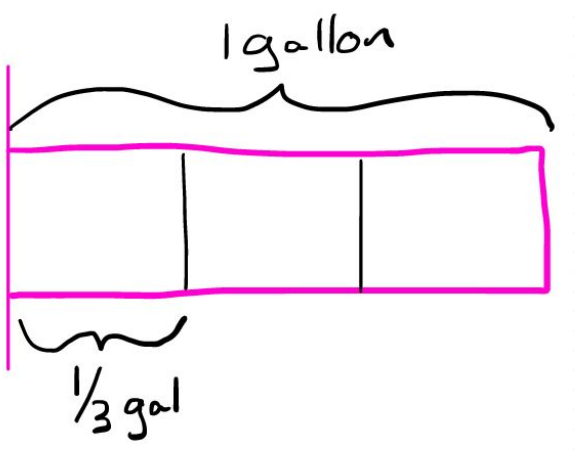


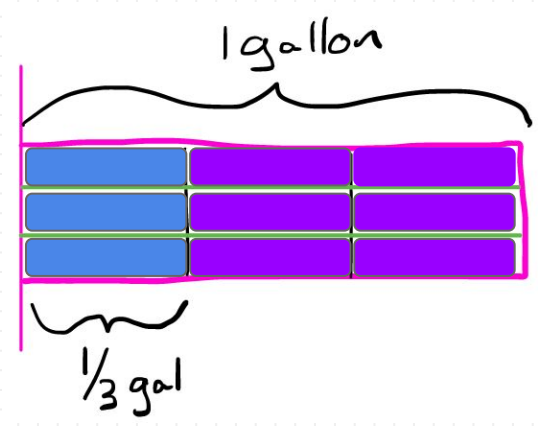
Each friend gets 1 ½ chocolate bars.

Fun Examples (Grades 3-5)

5.NF.7: Divide a Unit Fraction by Whole Number Partitive

Tara has 1/3 of a gallon of paint. She paints 3 walls and uses the same amount of paint on each wall. How many gallons of paint does she use on each wall?

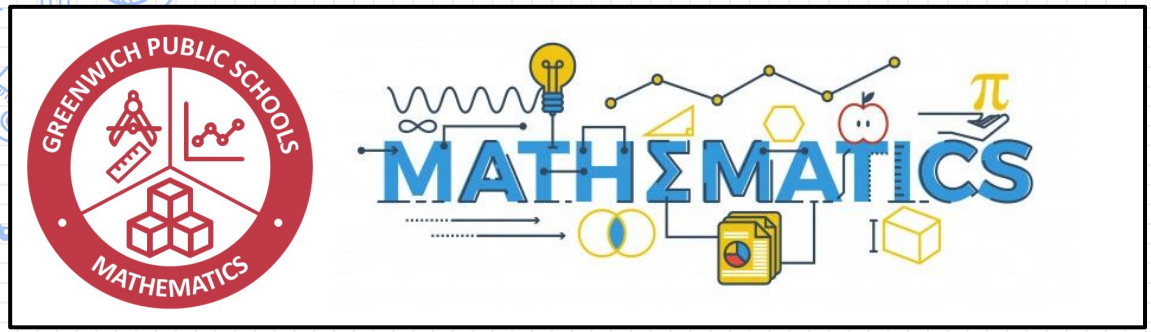




$\frac{1}{3} \div 3$

$\frac{1}{3} \times \frac{1}{3} = \frac{1}{9}$ gallons

Parent Resources!



[District Support]

[Cohesive Progressions]

[Standards for Mathematical Practice]