A FOCUS ON FRACTIONS

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THE OPERATIONS

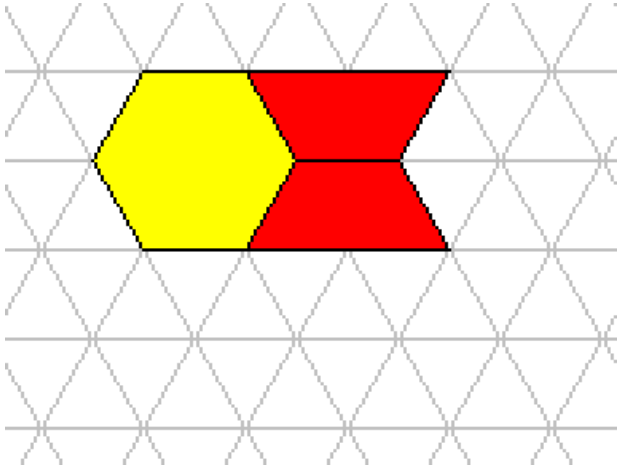
- What about fractions do kids need to know?

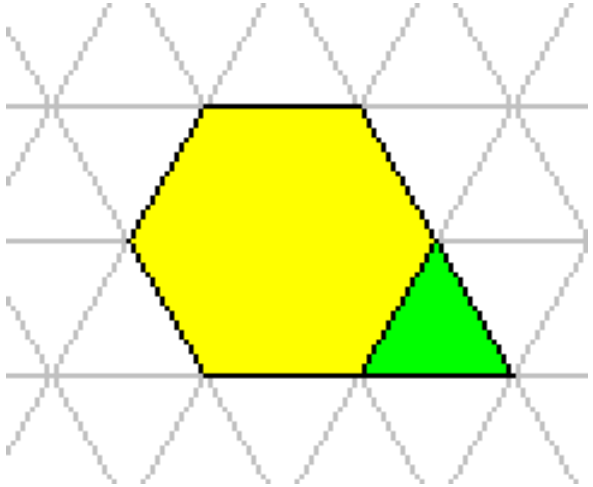
FIRST TRY THIS

- Use pattern blocks to create a design that is ½ yellow.
- Let's see what we notice.

HALF IN WHAT WAY?

- Half in volume? Area? Or number?





WHAT WOULD HAPPEN IF..

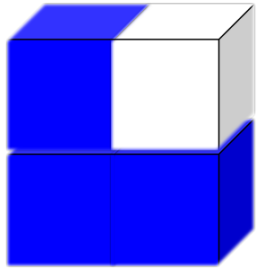
- What would happen if you duplicated your design?
- Would the fraction(s) change?

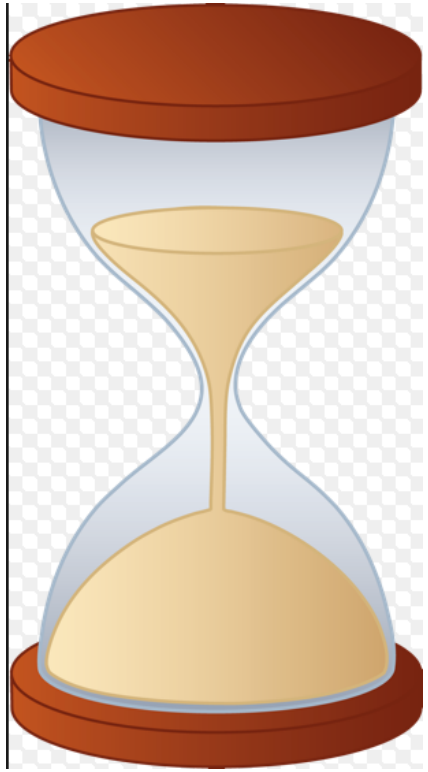
BIG IDEAS IN FRACTIONS

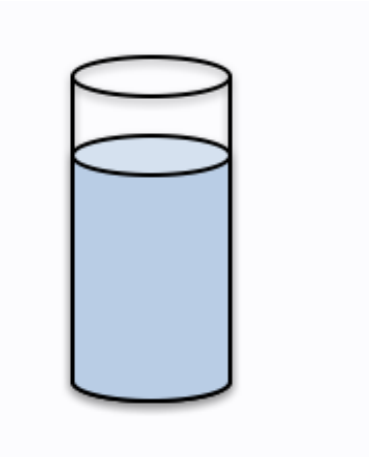
- Different representations of fractions reveal different things about them.

- For example, what do each of these pictures show you about 3/4?

MAYBE







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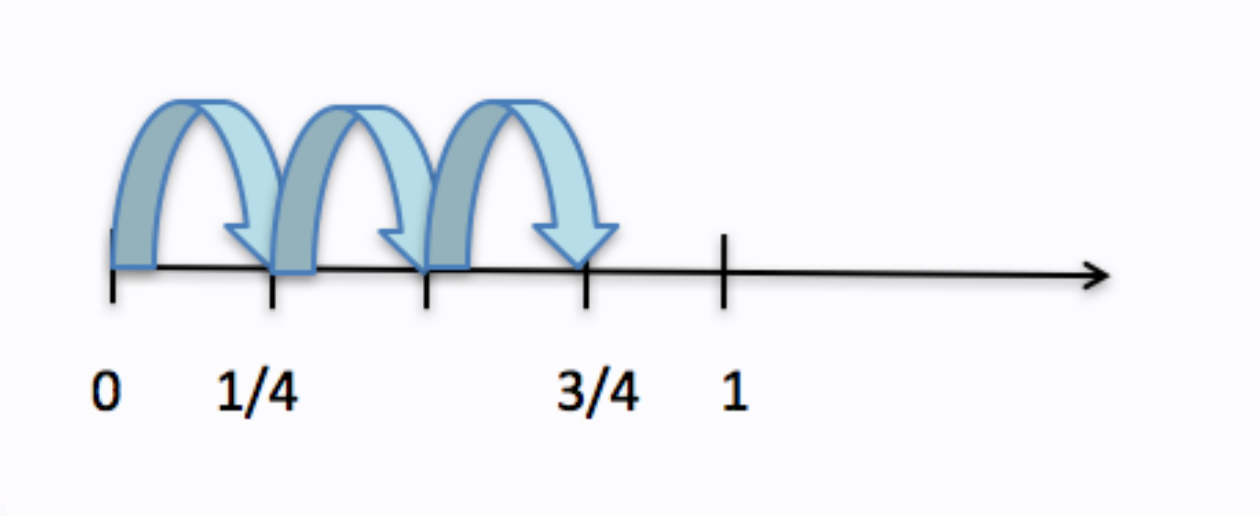
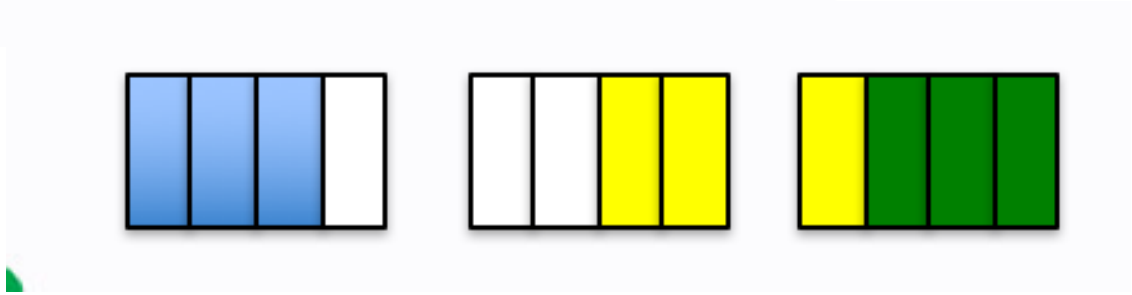
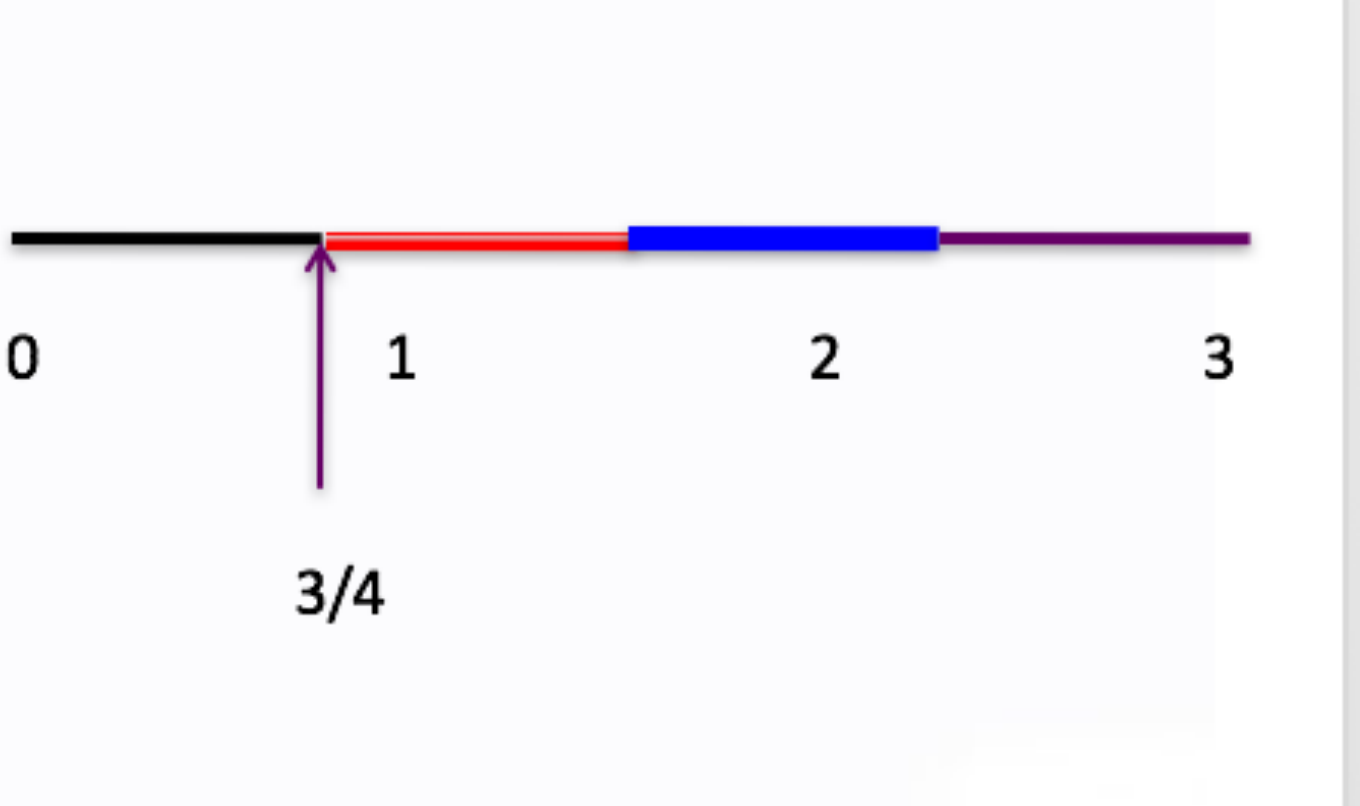


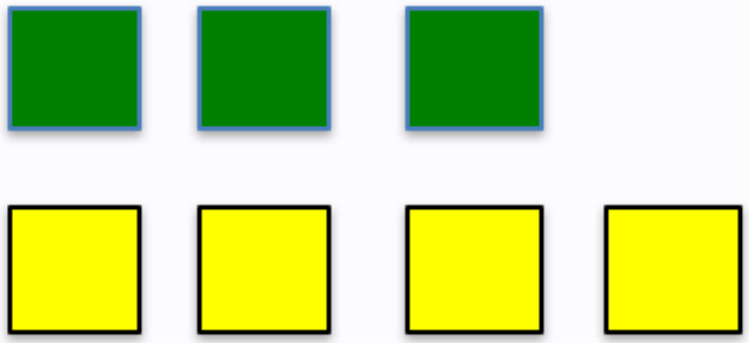


MAYBE



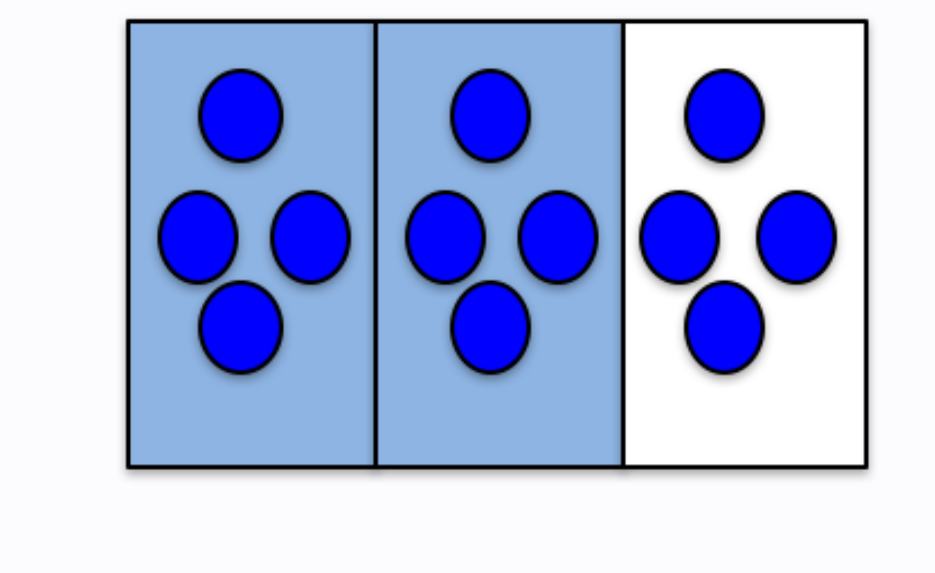
MAYBE

- 3 is 3/4 of 4.
- 4 is 1 1/3 (4/3) of 3.



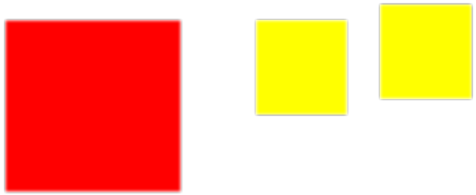
RELATING PART OF SET AND PART OF WHOLE

- Why is 2/3 of 12 = 8?

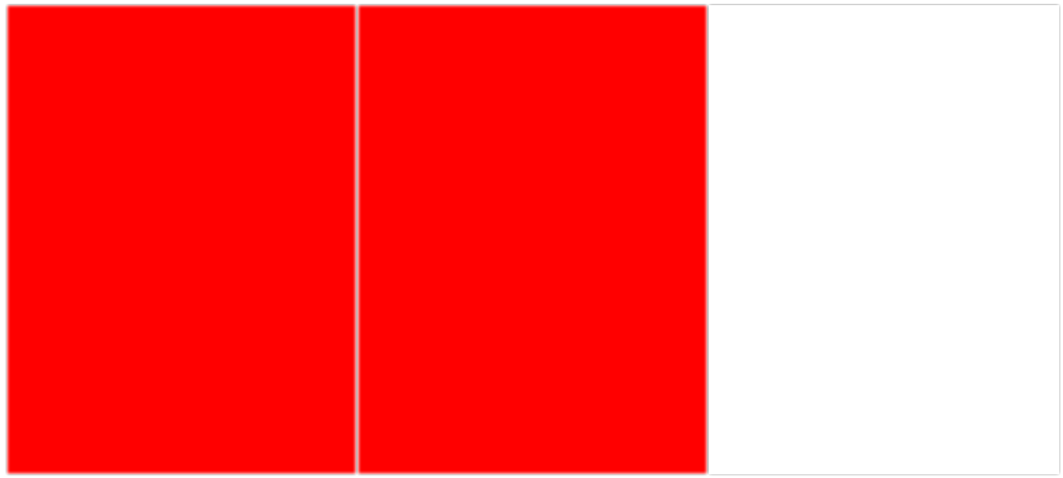


WHAT DO YOU MEAN WHEN

- You say the parts have to be equal?
- Is 1/3 red?

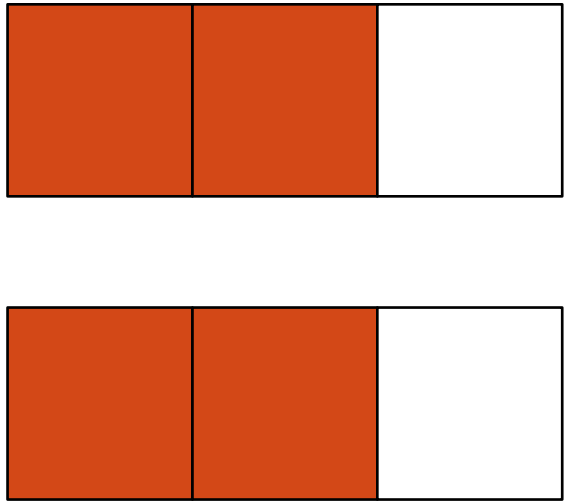


CAN YOU EVER SEE JUST ONE FRACTION?



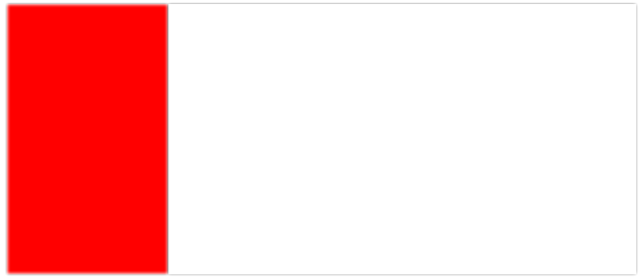
CONFUSION

- Is this 4/3 or 2/3?



IMPORTANCE OF ESTIMATION

- Instead of pre-divided fractions, we need to ask, e.g. about what fraction is red?

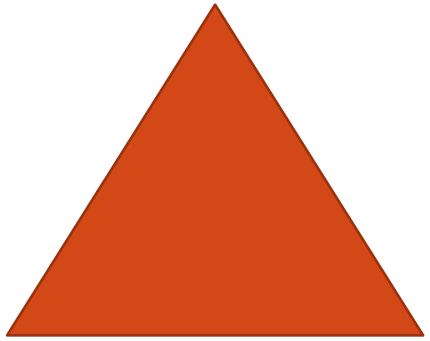


CREATING THEIR OWN MODELS

- Students should create their own models, BUT…. not to compare close fractions or to add and subtract.

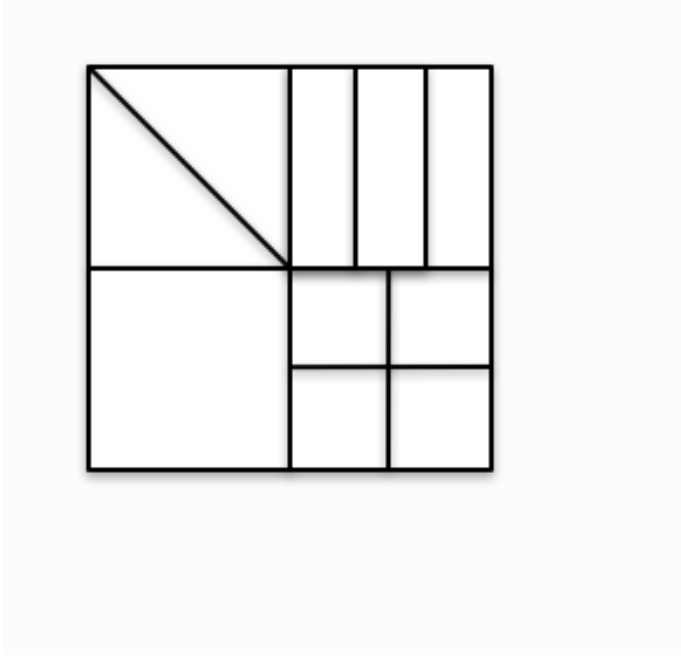
STARTING WITH THE PART

- If this triangle is 1/3, what could the whole look like?



RELATIONSHIPS BETWEEN FRACTIONS

- What fraction represents each part of the area of this whole?



COMPARING FRACTIONS

- Why might 2/3 actually be less than 1/3?

COMPARING FRACTIONS

- Why is it super easy to compare 3/95 and 8/9 without doing any work?

THE FRACTION TOWER

- What do you see?

1																			
$\frac{1}{2}$	$\frac{1}{2}$																		
$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$																	
$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$																
$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{5}$															
$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$														
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$												
$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$											
$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$										
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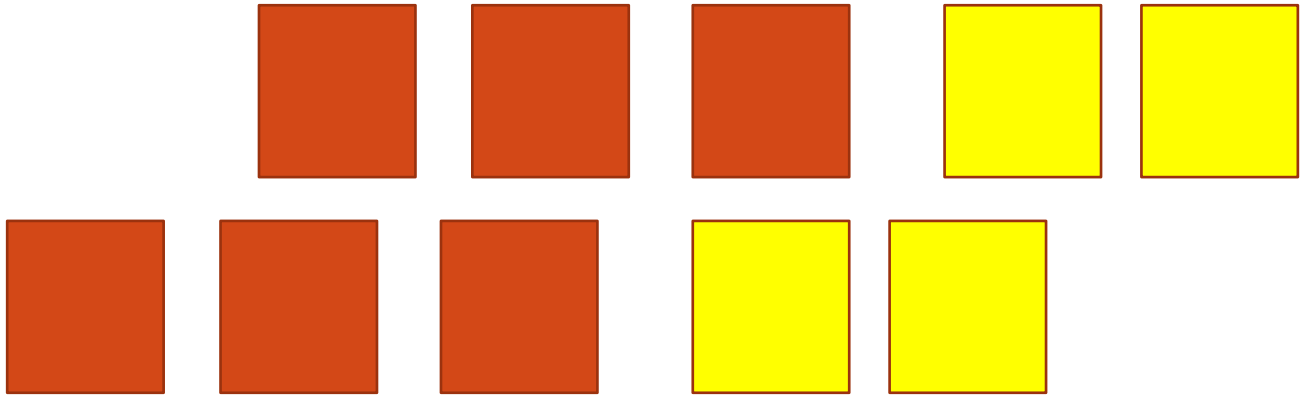
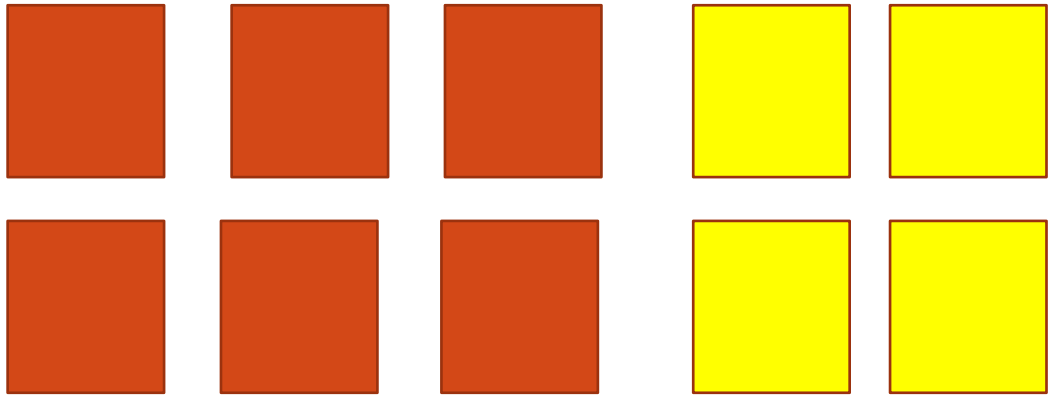
EQUIVALENCE

- Why is 3/5 = 6/10?

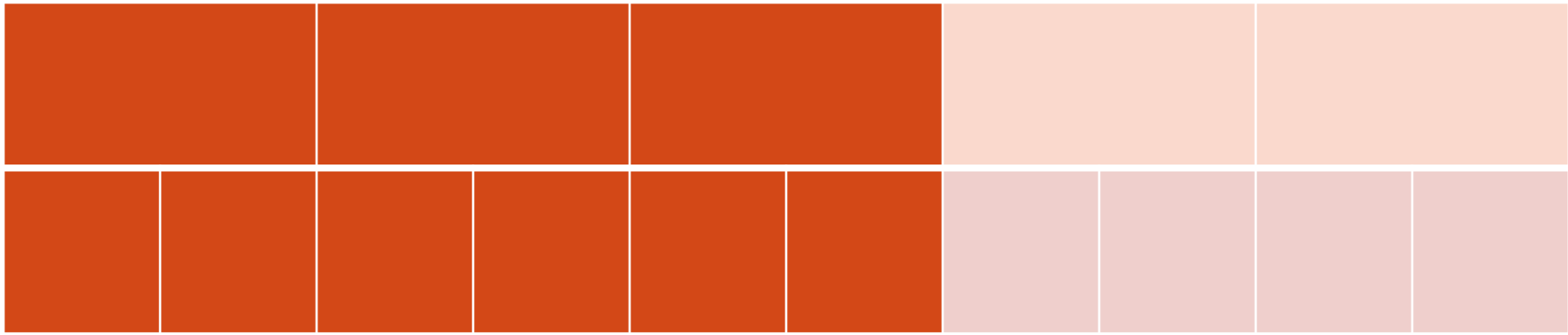
WHY IS THIS PICTURE NOT HELPFUL?



WHY IS THIS PICTURE MORE HELPFUL?



WHY IS THIS PICTURE EVEN MORE HELPFUL?



CONJECTURES

- Is this true or not?
- If a fraction has a greater numerator and denominator than a second one, it is a greater fraction.

CONJECTURES

- Is this true or not?
- If a fraction's numerator and denominator are closer than for a second fraction, it is a greater fraction.

EQUIVALENCE

- How far apart can the numerator and denominator of fractions equivalent to 3/5 be? Why?

ADDING AND SUBTRACTING

- It makes sense that 2 fifths + 3 fifths = 5 fifths.
- But it's hard to know what 2 fifths + 3 fourths is.

ADDING AND SUBTRACTING BY CHANGING UNITS

- Many of you think of 1/4 + 3/5 by using 25% + 60%.
- Here is an "analogy"

ADDING AND SUBTRACTING BY CHANGING UNITS

- 1/4 of an hour is 15 minutes.
- 3/5 of an hour is 36 minutes.
- The total is 51 minutes, which is 51/60 hours (or 17/20).

ADDING AND SUBTRACTING BY CHANGING UNITS

- A number that is easy to take 4ths and 5^{ths} of is 40, so:
- 1/4 of 40 is 10.
- 3/5 of 40 is 24.
- The total is 34 and 34/40 = 17/20.

USING A GRID FOR 3/5 + 1/4

X o	**o**	**o**	**o**
X 0	0	0	0
X 0	0	0	0
x			
x			

USING A GRID

o	o	o	o
0	0	0	0
0	0	0	0
x	x	x	x
x			

SUBTRACTION

- How might you figure out 2/3 – 1/4 using a grid?

SUBTRACTION OF 2/3 – 1/4

x	x	
x	x	
x	x	
x	x	

SUBTRACTION OF 2/3 – 1/4

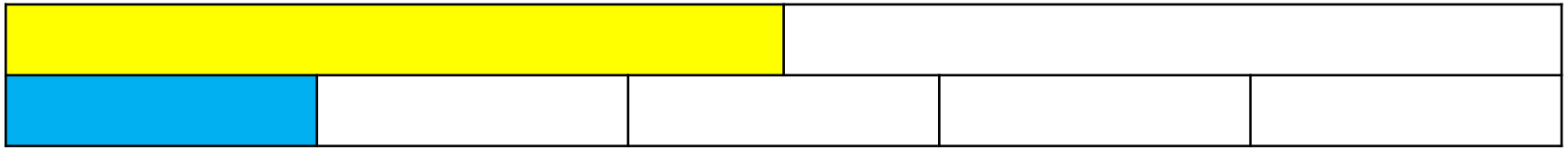
x	x	x
x	x	
x	x	
x		

SUBTRACTION OF 2/3 – 1/4

x	x	
x	x	
x		

DIVISION

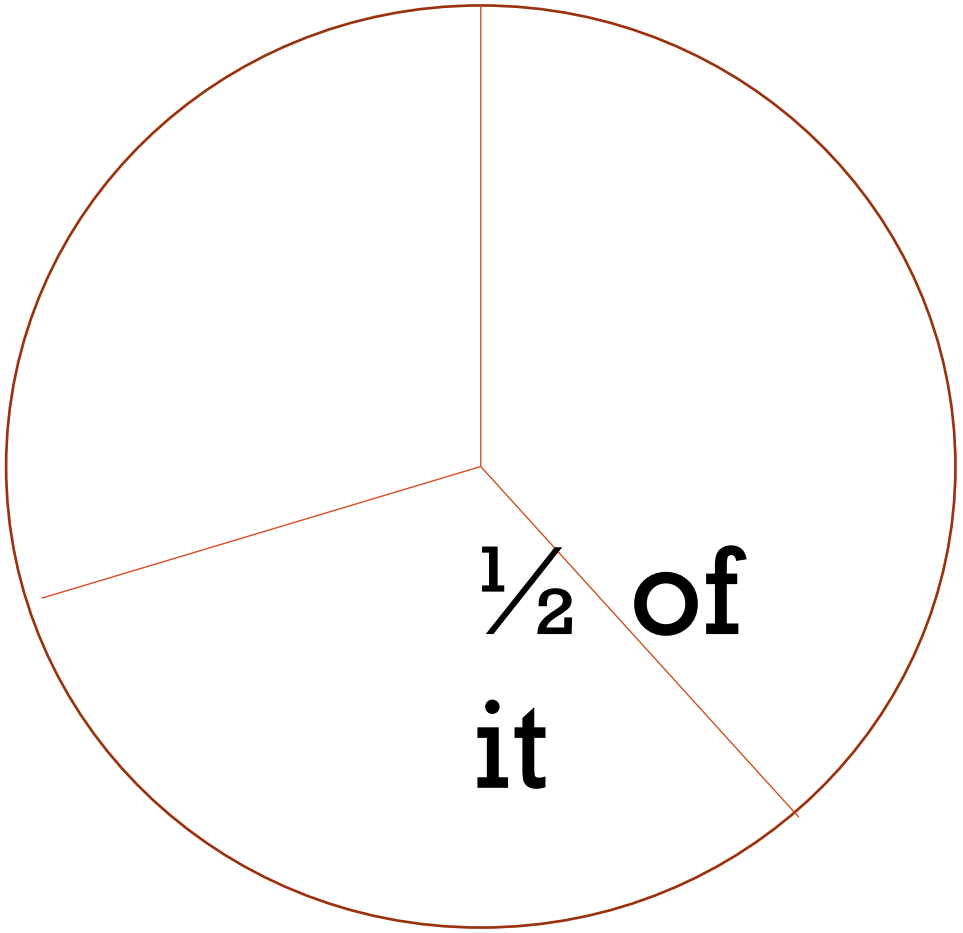
- How does this picture help you see why $1/2 \div 1/5 = 5/2$?



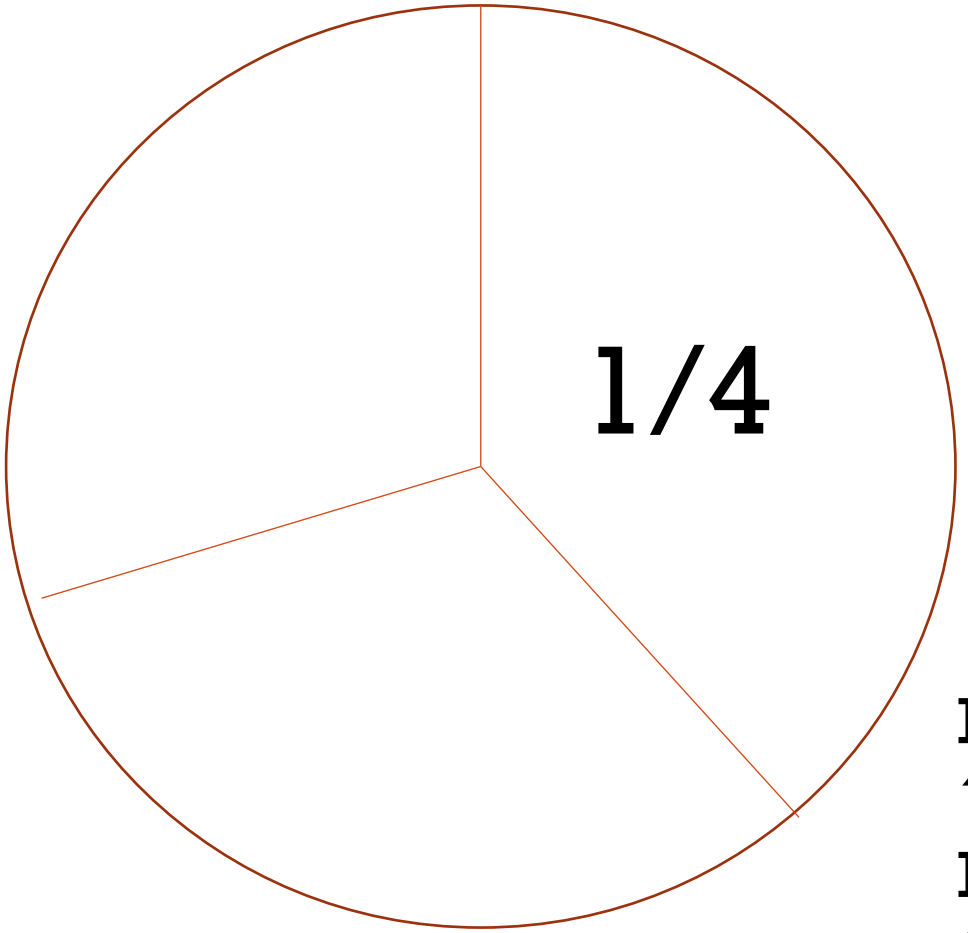
DIVISION

- How do we decide km/h if we know we drive 120 km in 2 hours?
- We divide.
- So 1/2 ÷ 2/3 asks how much you can do in an hour if you can do 1/2 of something in 2/3 of an hour.

DIVISION



DIVISION



½ x ½ x 3=

½ x 3/2

SOME INTERESTING QUESTIONS

- Use square tiles.
- Make a design that is almost ½ red.

SOME INTERESTING QUESTIONS

- Make a pattern block design that is 2/3 red in area. What fraction of the blocks are red?
- Why is it or is it not 2/3?

SOME INTERESTING QUESTIONS

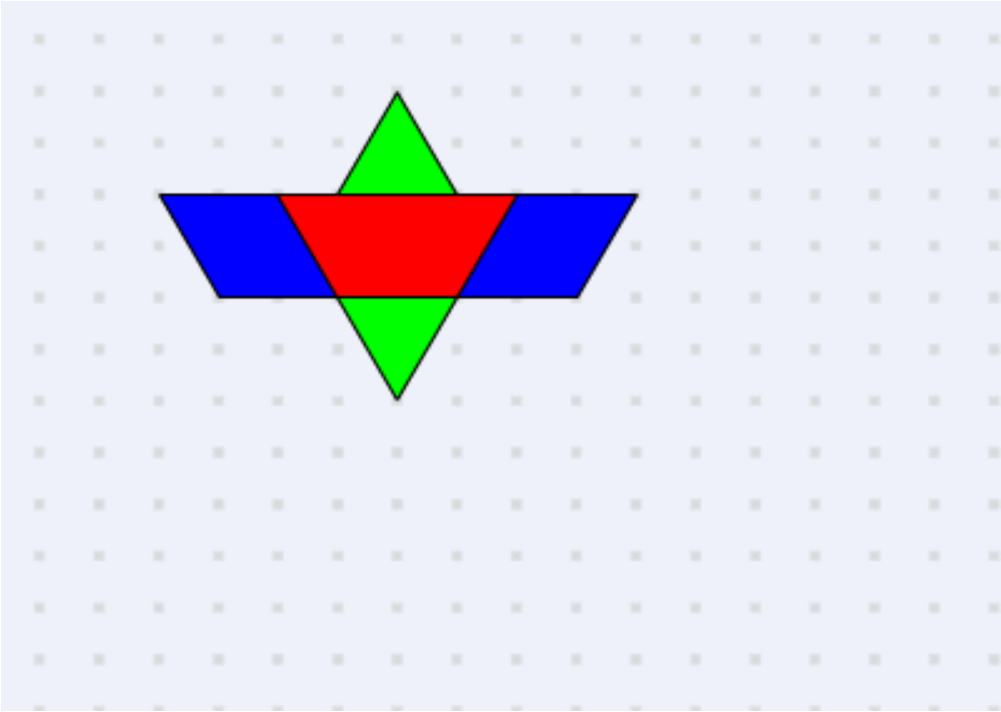
- Make a pattern block design that is 1/2 green and 1/5 blue.

SOME INTERESTING QUESTIONS

- Make a pattern block design that is almost 2/3 yellow in area.

SOME INTERESTING QUESTIONS

- What fractions do you see?



SOME INTERESTING PROBLEMS

- You add two fractions and the result has a denominator of 12.
- What denominators might the fraction you added have had?

SOME INTERESTING PROBLEMS

- You multiply two fractions and the result is greater than one of them, but less than the other.
- What fractions might you have multiplied?

SOME INTERESTING PROBLEMS

- You divide two fractions and the result is almost, but not quite, 1.
- What fractions might you have divided?
- What if you divided them in the other order?

ANY QUESTIONS?

- Did you want to raise some fraction questions?

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