



# **Parent Workshop Mathematics**

**Year 4, 5 & 6**

**January 2020**

# Aims

To understand progression through the maths curriculum from year 4 to 5 through to year 6.

To discuss how we are implementing these skills and understanding through our teaching.

To explore the context of mastery teaching in maths with a focus on fractions

# What constitutes Mastery Teaching in Maths?

Context



Context: giving a real life scenario to make the learning more meaningful.

Concrete



Concrete: letting children manipulate concrete apparatus to explore the mathematical concept and deepen understanding.

Pictorial



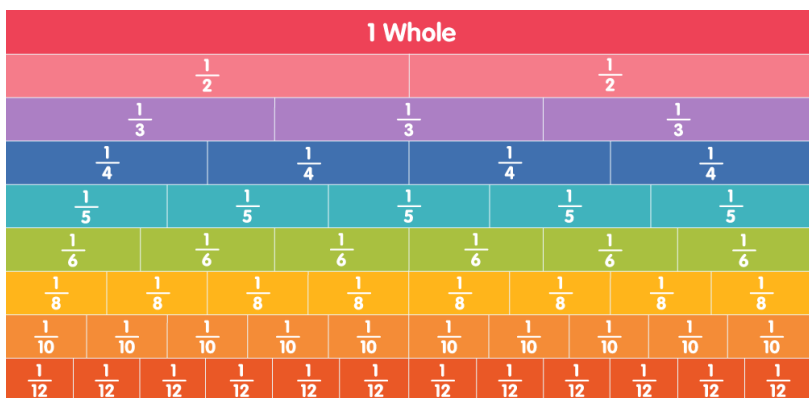
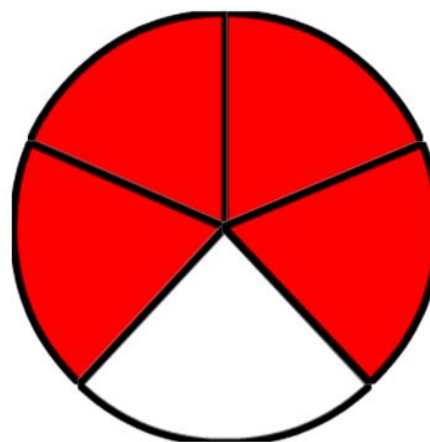
Pictorial: a visual and graphic representation of the mathematical concept.

Abstract

Abstract: The mathematical concept represented purely with numbers and mathematical symbols.

During the Spring term, all KS2 classes will be learning about fractions.

This nows takes longer than it might have previously, as it allows for time for concepts to be deeply explored and understood.



Write these fractions in order, smallest first.

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

## Fractions: Recognise and Write

### Year 4

- count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten.

Spring 3

### Year 5

- identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths
- recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements  $> 1$  as a mixed number [for example,  $\frac{2}{5} + \frac{4}{5} = \frac{6}{5} = 1\frac{1}{5}$ ]

Spring 2

### Year 6

## Fractions: Compare

- recognise and show, using diagrams, families of common equivalent fractions

Spring 3

- compare and order fractions whose denominators are all multiples of the same number

Spring 2

- use common factors to simplify fractions; use common multiples to express fractions in the same denomination
- compare and order fractions, including fractions  $> 1$

Autumn 3

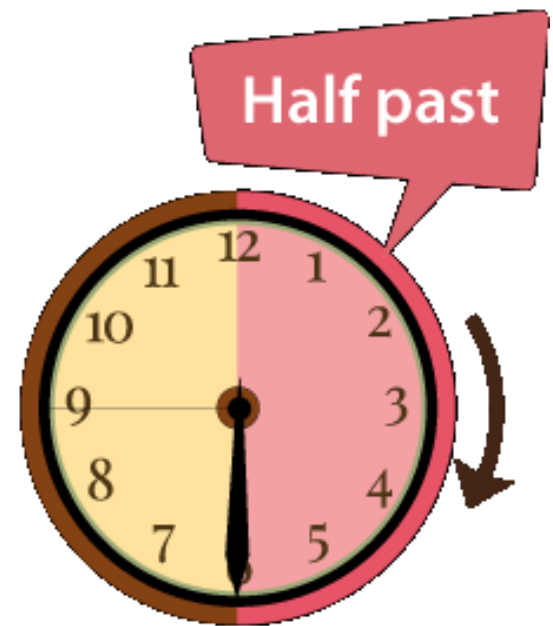
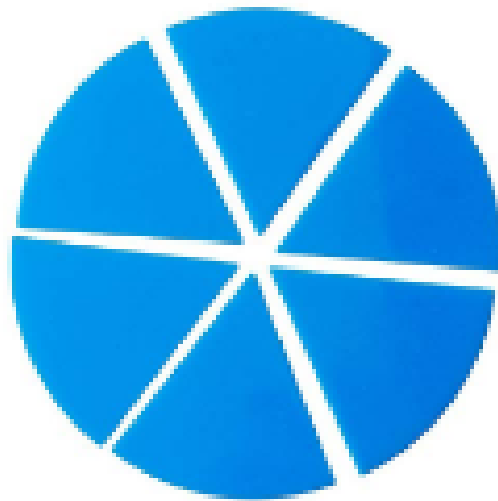
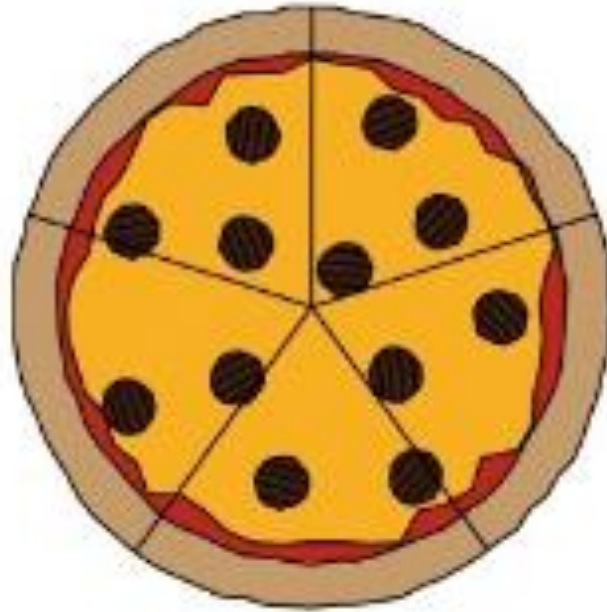
	Year 4	Year 5	Year 6
Fractions: Calculations	<ul style="list-style-type: none"> <li>add and subtract fractions with the same denominator</li> </ul> <p style="text-align: center;"><b>Spring 3</b></p>	<ul style="list-style-type: none"> <li>add and subtract fractions with the same denominator and denominators that are multiples of the same number</li> <li>multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams</li> </ul> <p style="text-align: center;"><b>Spring 3</b></p>	<ul style="list-style-type: none"> <li>add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions</li> <li>multiply simple pairs of proper fractions, writing the answer in its simplest form [for example, <math>\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}</math>]</li> <li>divide proper fractions by whole numbers [for example, <math>\frac{1}{3} \div 2 = \frac{1}{6}</math>]</li> </ul> <p style="text-align: center;"><b>Autumn 3</b></p>
Fractions: Solve Problems	<ul style="list-style-type: none"> <li>solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number</li> </ul> <p style="text-align: center;"><b>Spring 3</b></p>		

Some of the vocabulary the children are expected to know, use and understand by year 6 include;

fraction  
proper/improper fraction  
equivalent fraction  
mixed number  
numerator  
denominator  
halves

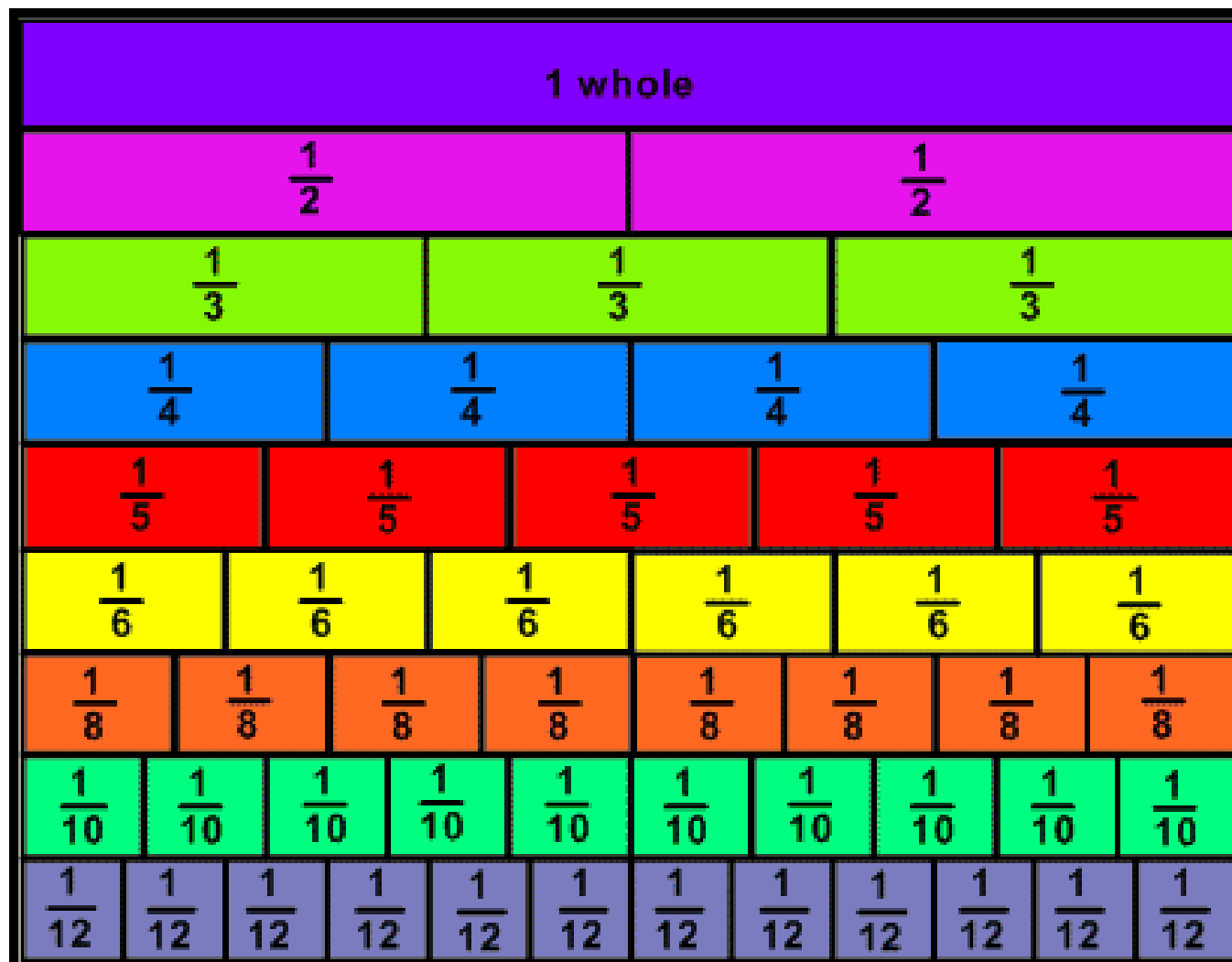
quarter  
thirds, fifths, sixths, sevenths, etc  
tenths ... hundredths, thousandths  
decimal  
decimal fraction  
percentage %

When introducing fractions into any year, we would start with many visuals and concrete objects to help to contextualise the learning.





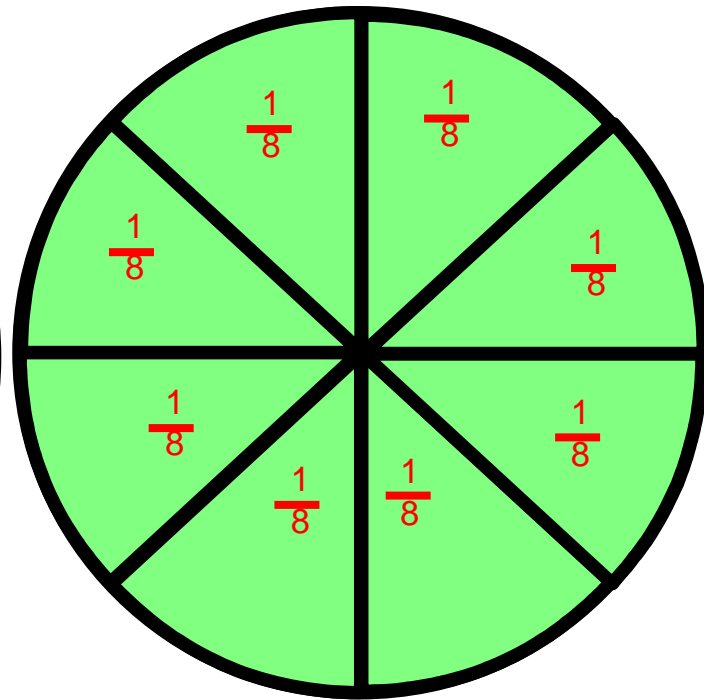
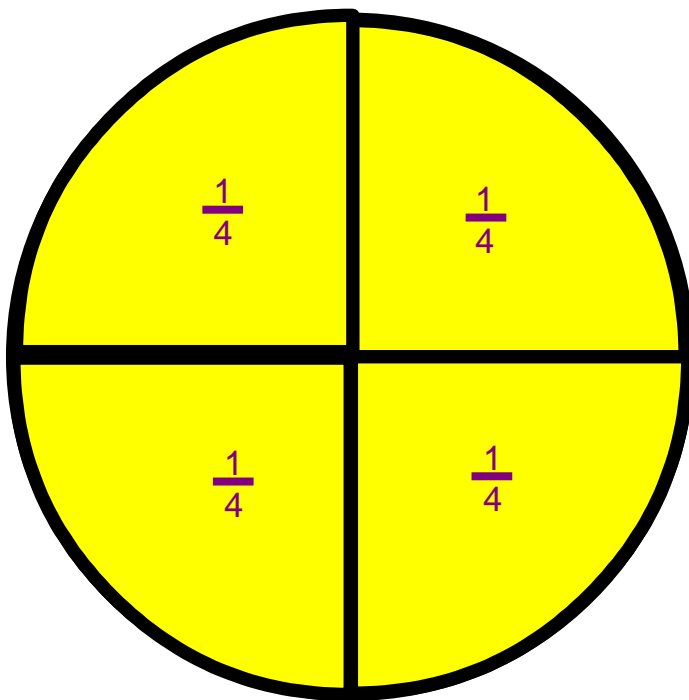
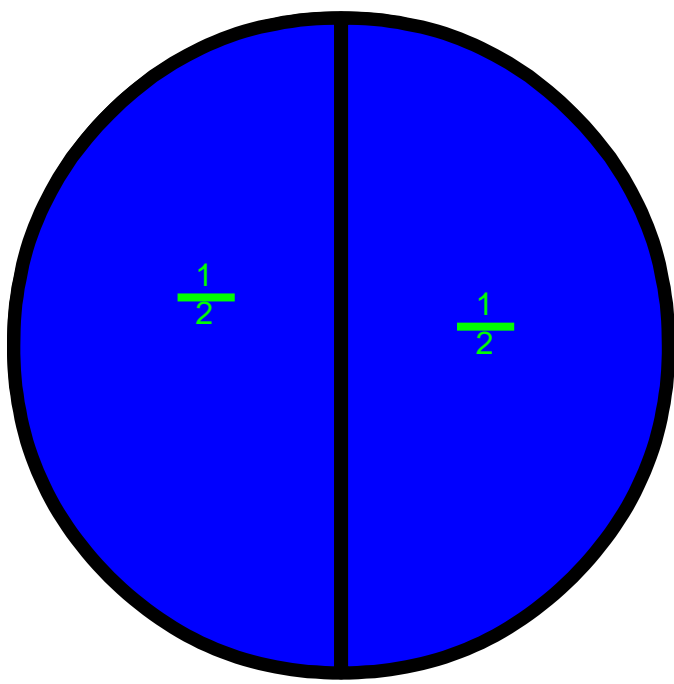
# Equivalent Fractions



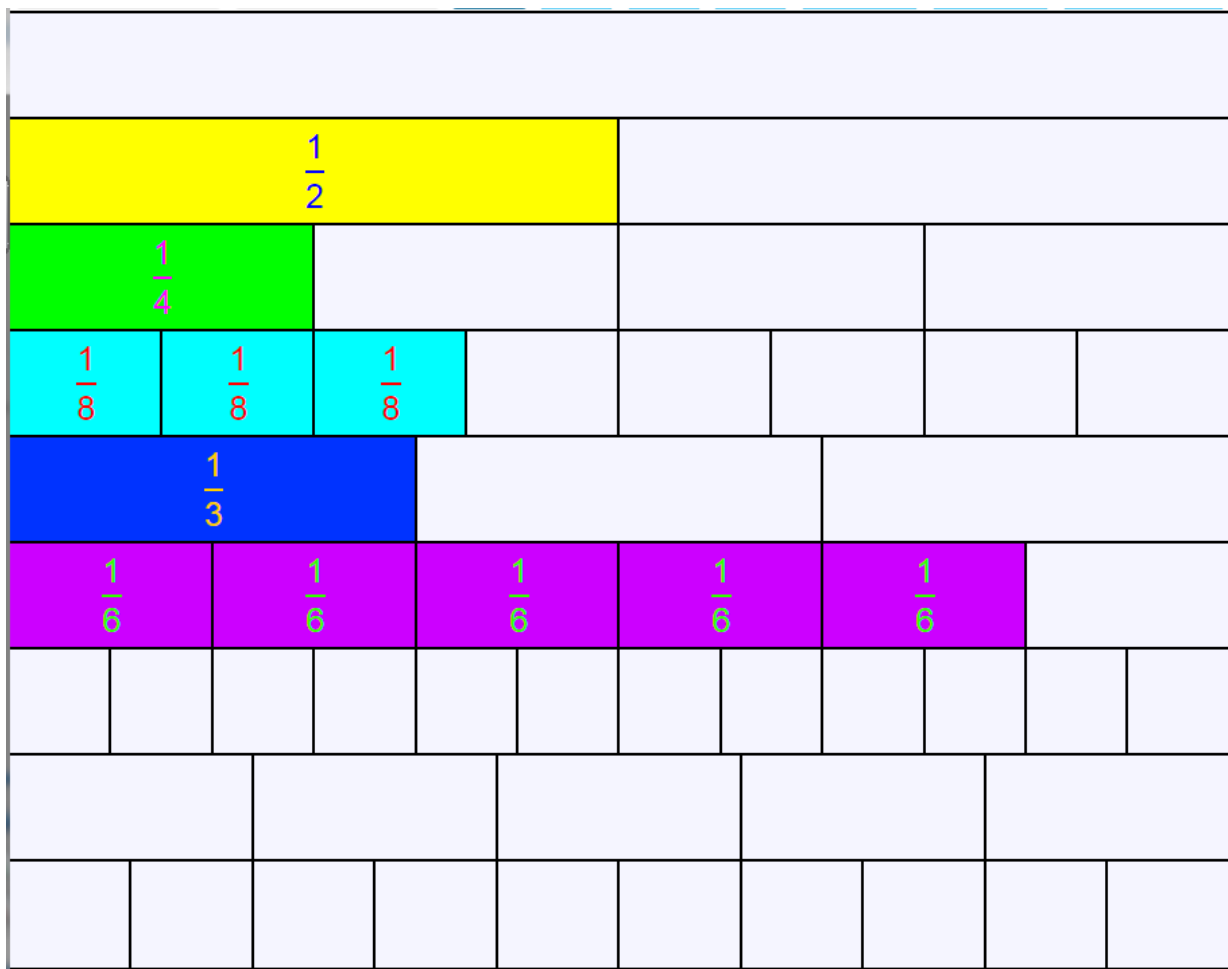
Use the fraction wall to find fractions equivalent to;

$\frac{1}{2}$     $\frac{2}{3}$     $\frac{1}{4}$   
 $\frac{2}{2}$     $\frac{3}{3}$     $\frac{4}{4}$

So the children can physically see what it means for fractions to be equivalent.



What fractions are the same as two quarters?  
We then prove it with a different visual.



Fractions walls can then be used to prove why one fraction is bigger than another.

e.g.

$$\frac{1}{2} > \frac{3}{8}$$

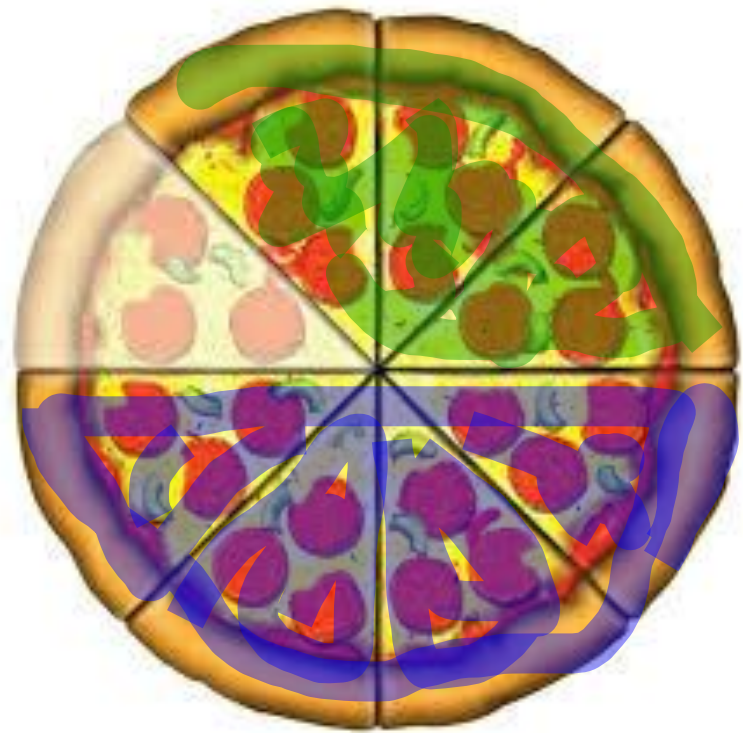
$$\frac{1}{3} < \frac{5}{6}$$

When that is understood, we can move to the abstract.

$$\frac{1}{2} \quad \square \quad \frac{3}{8} \quad \underline{\hspace{1cm}}$$

Find the lowest  
common denominator.

# Adding Fractions same denominator



I eat  $\frac{3}{8}$  of a pizza.

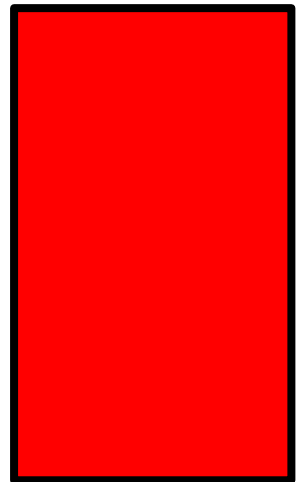
Later I eat another  $\frac{4}{8}$ .

How much pizza have I eaten?

$$\frac{3}{8} + \frac{4}{8} = \frac{7}{8}$$

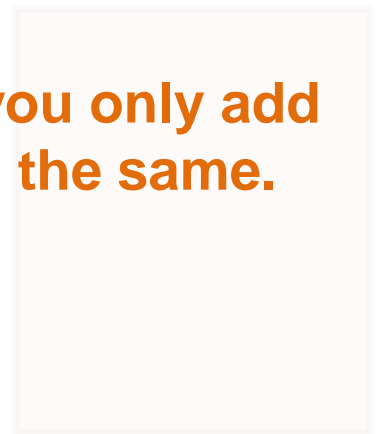
**When you add fractions with the same denominator you only add the numerators together and the denominator stays the same.**

$$\frac{3}{7} + \frac{2}{7} = ?$$



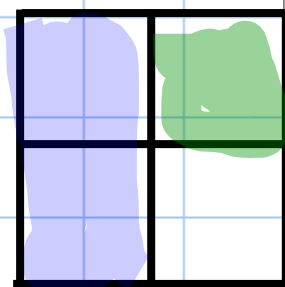
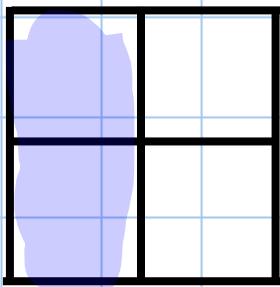
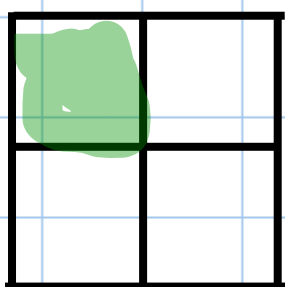
$$\frac{5}{7}$$

When you add fractions with the same denominator you only add the numerators together and the denominator stays the same.



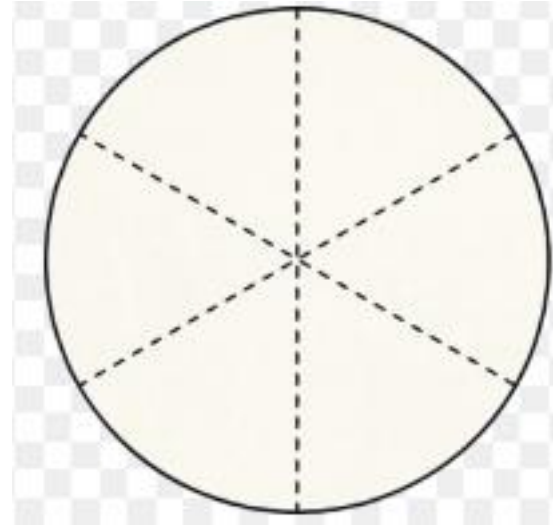
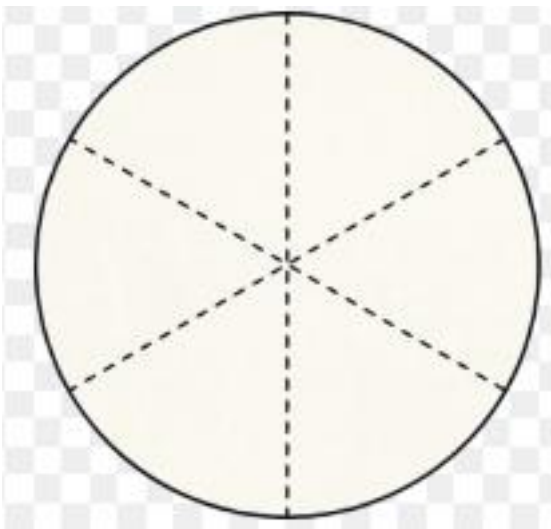
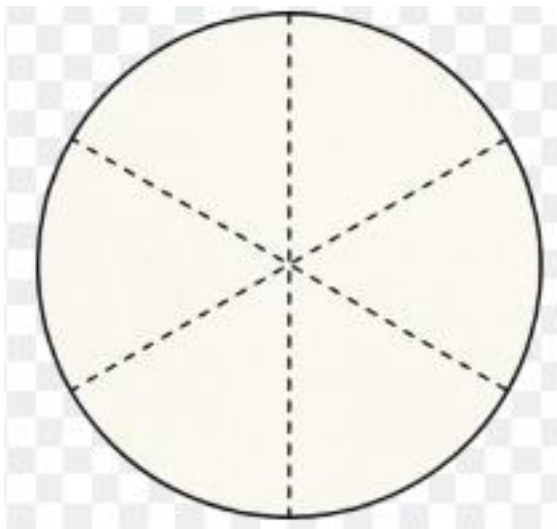
# Adding fractions

$$\frac{1}{4} + \frac{2}{4} =$$



**When you add fractions with the same denominator you only add the numerators together and the denominator stays the same.**



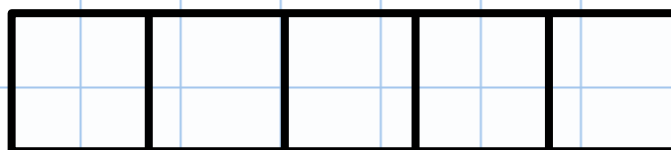


$$\frac{1}{6} + \frac{4}{6} =$$

**When you add fractions with the same denominator you only add the numerators together and the denominator stays the same.**

L.O. To add fractions with a common denominator


$$\frac{2}{5} + \frac{1}{5} =$$

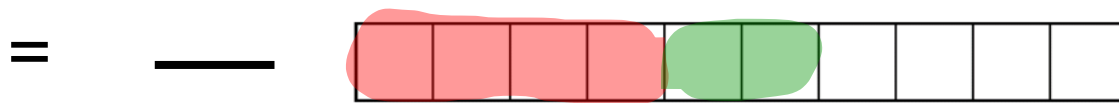
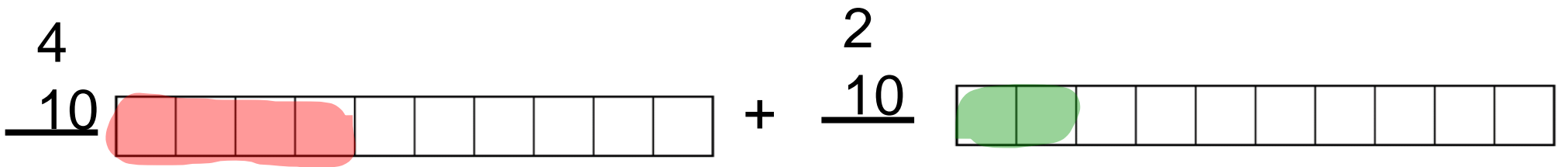


**When you add fractions with the same denominator you only add the numerators together and the denominator stays the same.**

# Adding Fractions different denominator

$$\frac{4}{10} + \frac{1}{5} = \text{LCD} =$$

$$\frac{4}{10} + \frac{1}{5} = \underline{\hspace{2cm}}$$




$$\frac{2}{5} + \frac{1}{3}$$

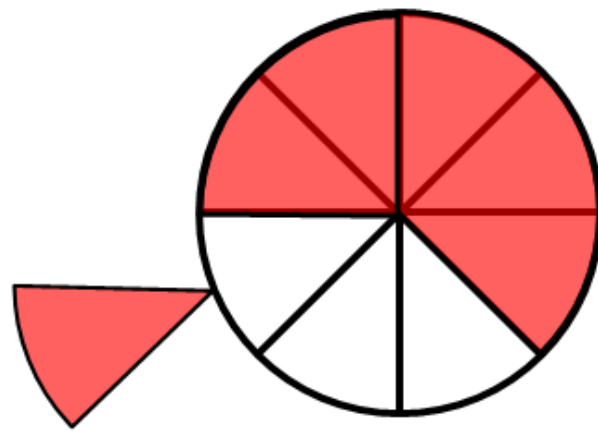
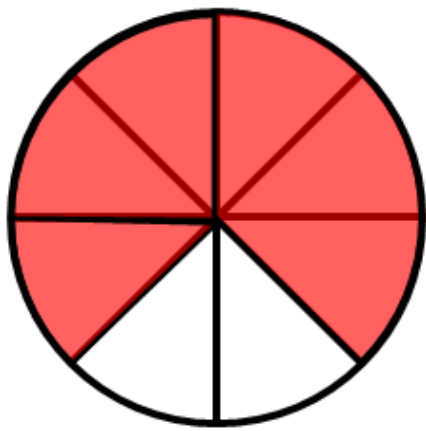
LCD=

$$\frac{2}{5} + \frac{1}{3} = \frac{6}{15} + \frac{5}{15}$$

Then apply what you know about adding fractions with the same denominator.

# Subtracting Fractions

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



$$\frac{6}{8} - \frac{1}{8} = \frac{\boxed{\phantom{000}}}{8} =$$

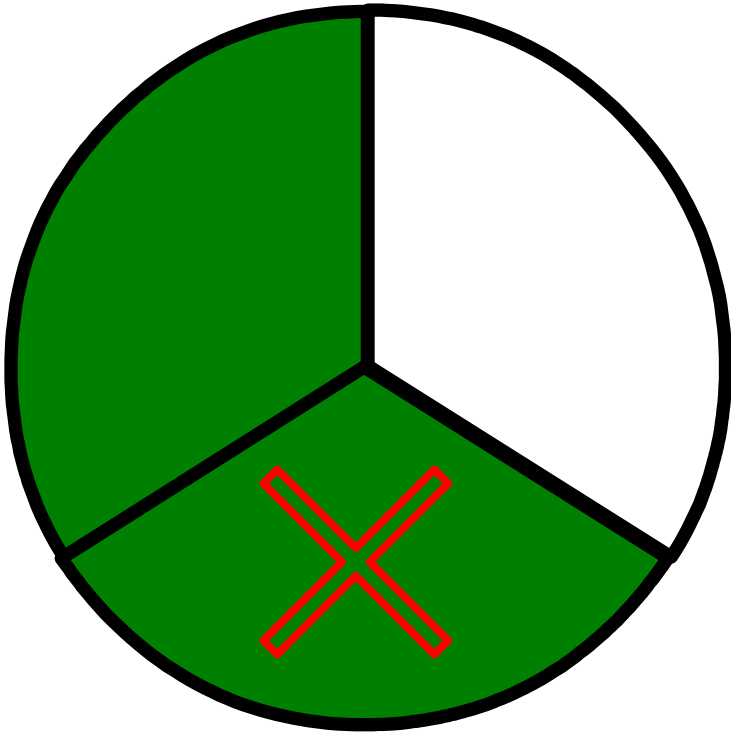
**When you subtract fractions with the same denominator you subtract the numerators and the denominator stays the same**

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

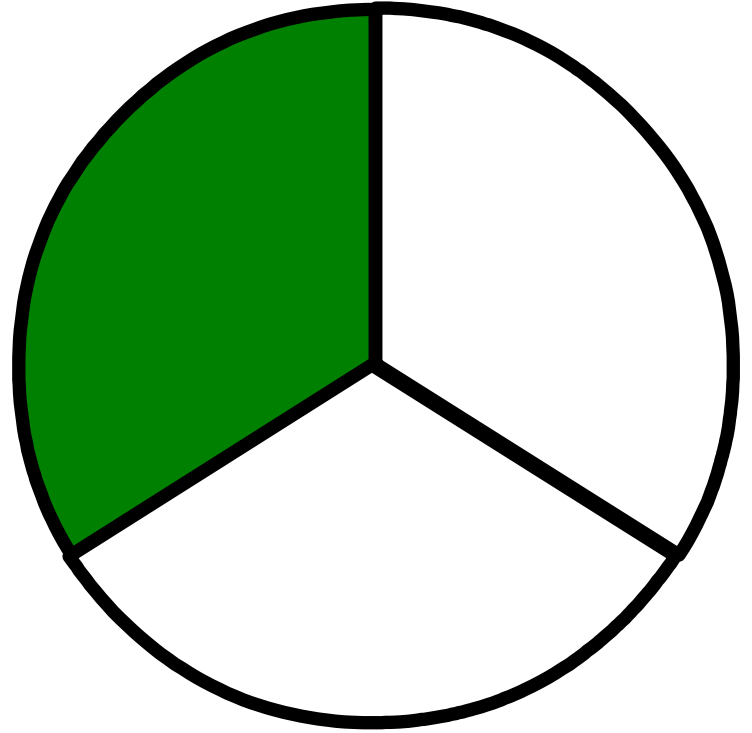
-

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

=



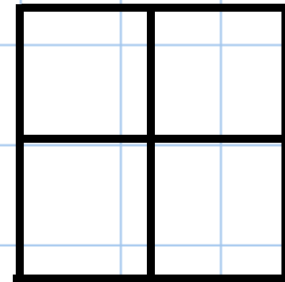
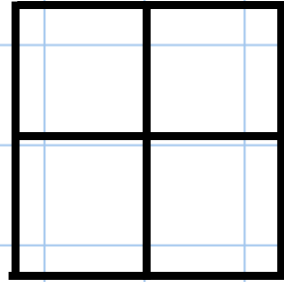
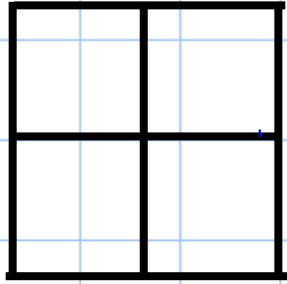
=



**When you subtract fractions with the same denominator you subtract the numerators and the denominator stays the same**



$$\frac{3}{4} - \frac{1}{4} =$$



**When you subtract fractions with the same denominator you subtract the numerators and the denominator stays the same**

# Multiplying Fractions

## Multiplying fractions.

You might know the method but it is important that we fully understand exactly what we are doing!

$$\frac{1}{2} \quad \times \quad \frac{1}{4} \quad =$$

How would you say this equation?

The x sign, when dealing with fractions, actually means **OF!**

$$\frac{1}{2} \times \frac{1}{4} =$$

A half **OF** a quarter

So how do we prove this using pictorial representation?

$$\frac{1}{2} \times \frac{1}{4}$$



Find a quarter.

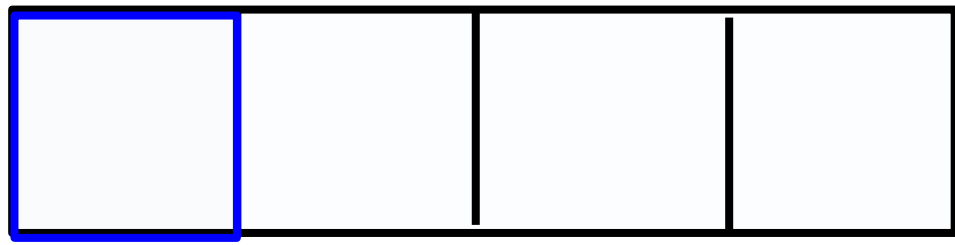
Now we want to find half OF it.

What fraction do we have?

How can we prove it?

$$\frac{1}{2} \times \frac{1}{4} =$$

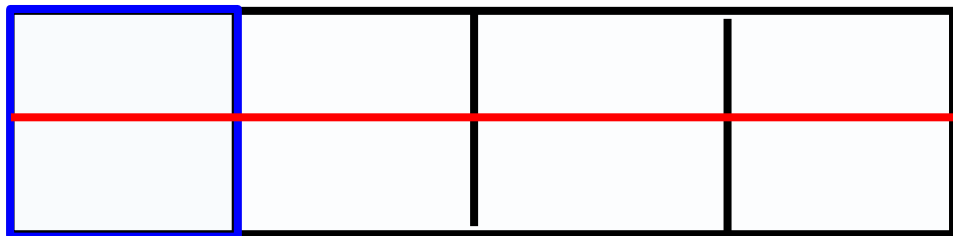
A half **OF** a quarter



Step 1: Show

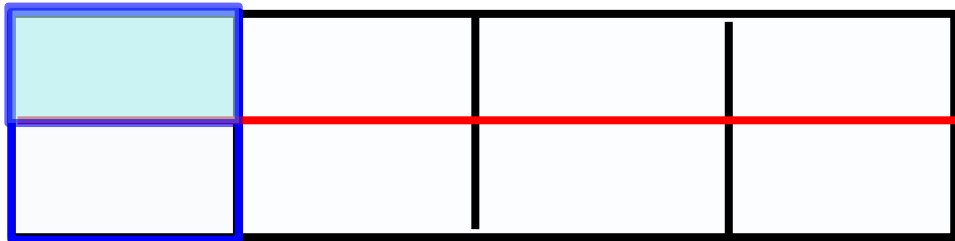
$$\frac{1}{4}$$

$$\frac{1}{2} \times \frac{1}{4} =$$



Step 2: We now need to find  $\frac{1}{2}$  of our selected quarter.

$$\frac{1}{2} \times \frac{1}{4} =$$



$$\frac{N}{D}$$

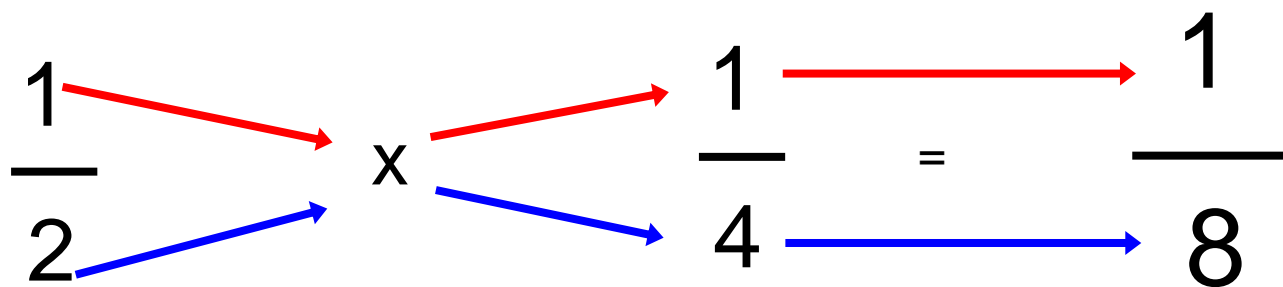
Step 3: How many segments do we now have in total? **This will be our denominator!**

Step 4: How many segments have we coloured? **This will be our numerator!**



$$\frac{1}{2} \times \frac{1}{4} =$$

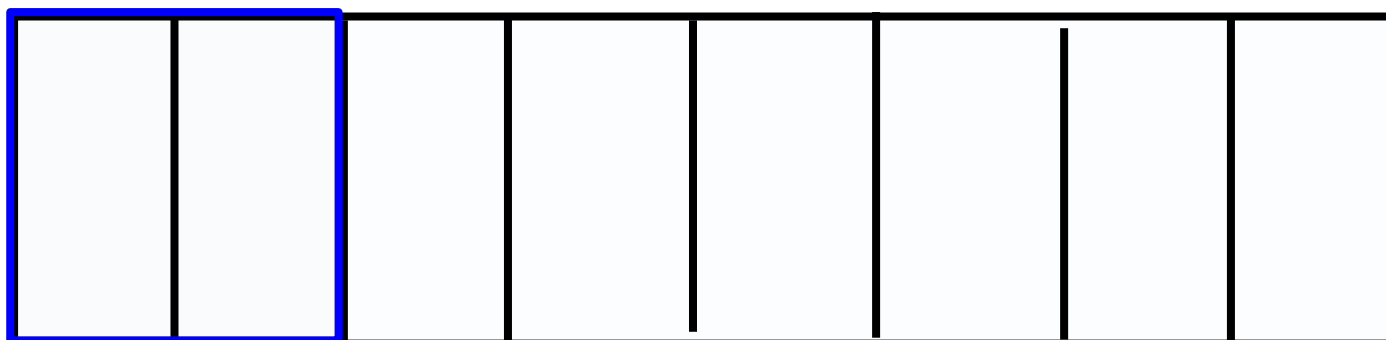
We can now use the procedural method to check our answer!



You do:

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$$\frac{1}{4} \times \frac{2}{8} = \frac{\boxed{N}}{\boxed{D}}$$



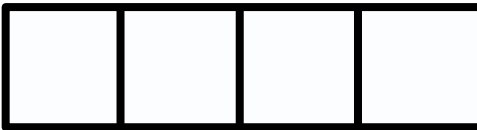
Step 1: Show  $\frac{2}{8}$

Step 2: Show  $\frac{1}{4}$  of the selected fraction


Step 3: How many segments do we now have in total? **This will be our denominator!**

Step 4: How many segments have we coloured? **This will be our numerator!**


Step 1

$$\frac{3}{5} \times \text{of} \frac{2}{4} =$$


Step 2

$$\frac{3}{5} \times \text{of} \frac{2}{4} =$$


Step 3

$$\frac{3}{5} \times \text{of} \frac{2}{4} =$$


Step 4

$$\frac{3}{5} \times \text{of} \frac{2}{4} =$$


Step 5

$$\frac{6}{20} \longrightarrow \frac{3}{10}$$

# Dividing Fractions

$$\frac{1}{4} \div 2$$

How do we say this?

$\frac{1}{2}$  divided by 2

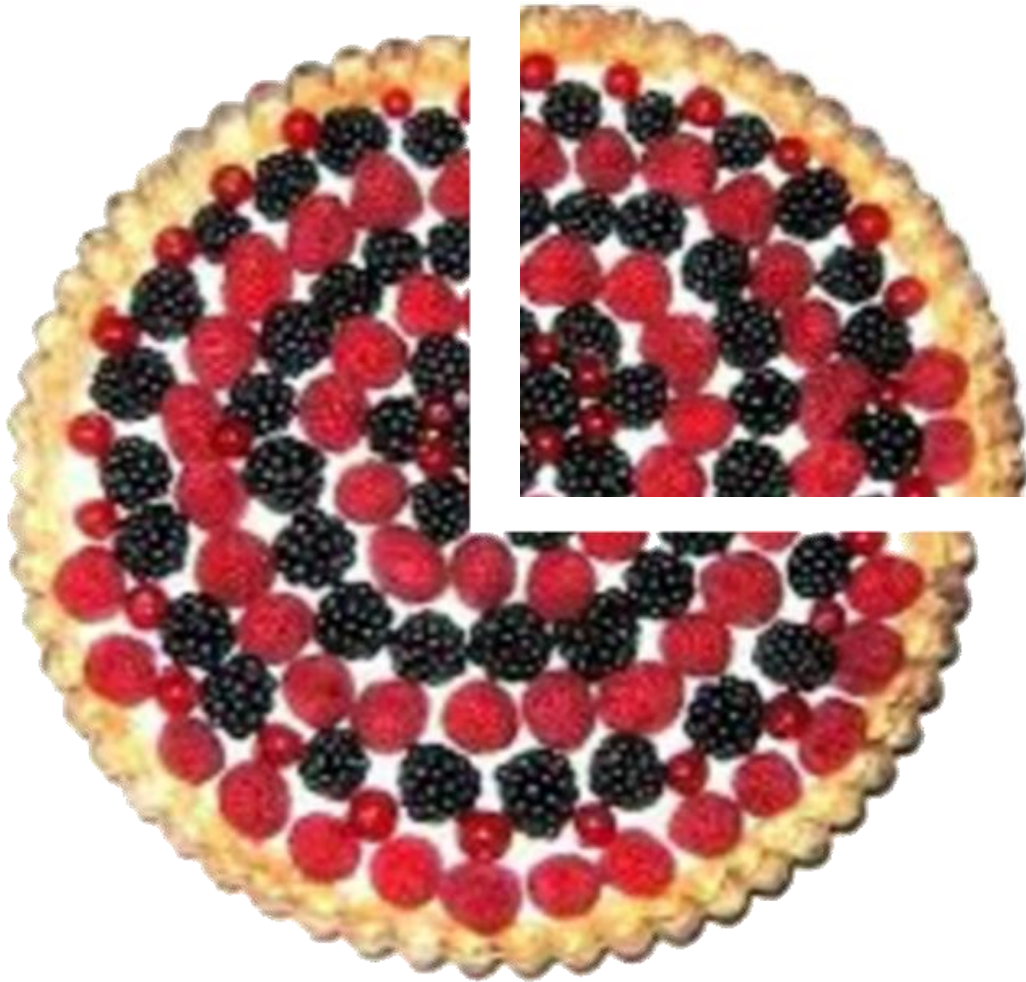
$\frac{1}{2}$  shared between two

$\frac{1}{4}$ 

÷

2

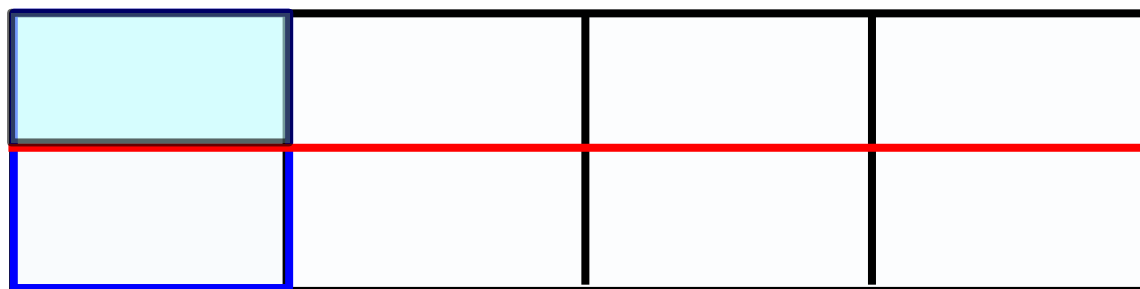
Find a quarter  
Share equally between two.



I do

$$\frac{1}{4} \div 2 = 2?$$

What are we doing when we divide by



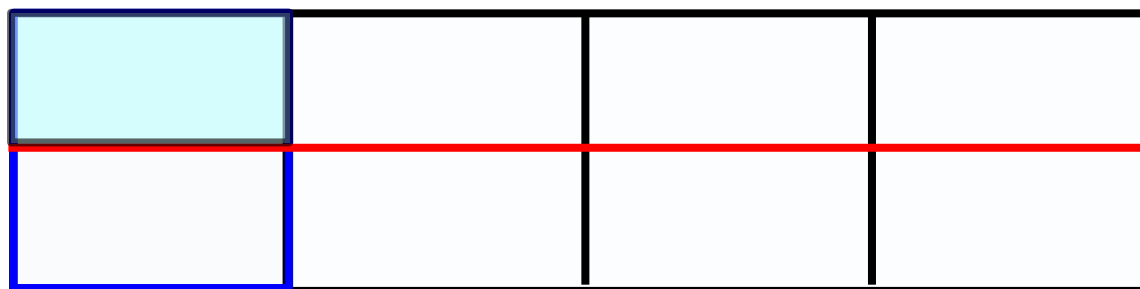
$$= \frac{1}{8}$$

Can we simplify?

I do

$$\frac{1}{4} \div 2 = 2?$$

What are we doing  
when we divide by



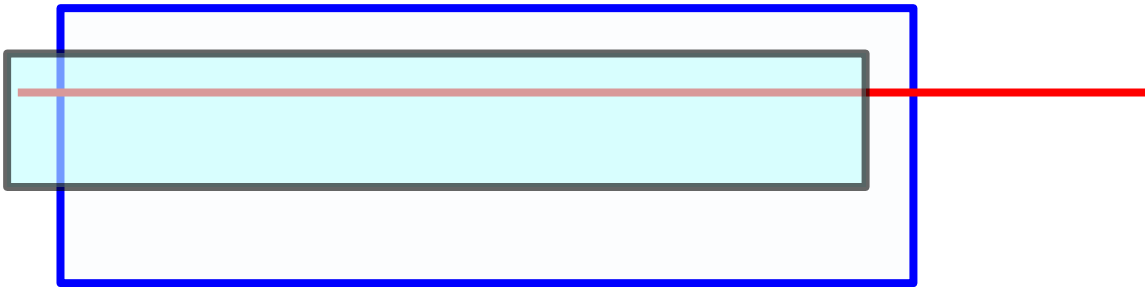
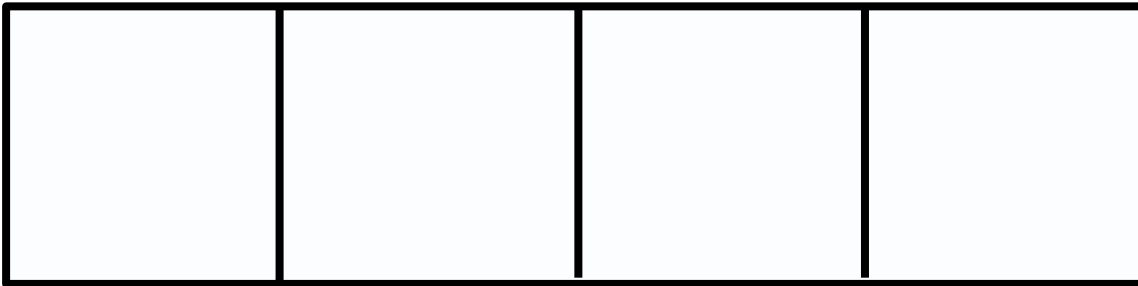
$$= \frac{1}{8}$$

Can we simplify?



We do

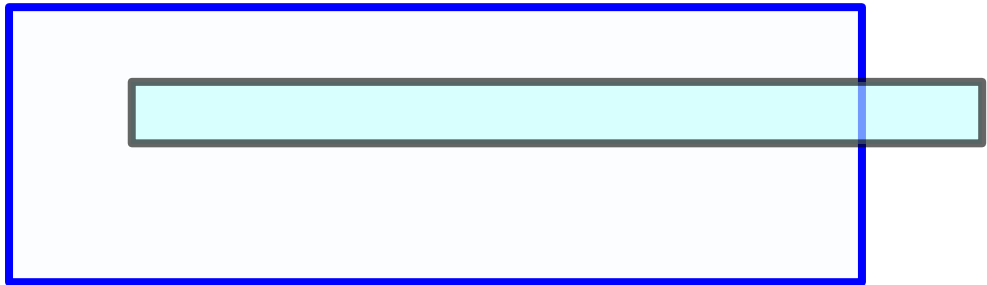
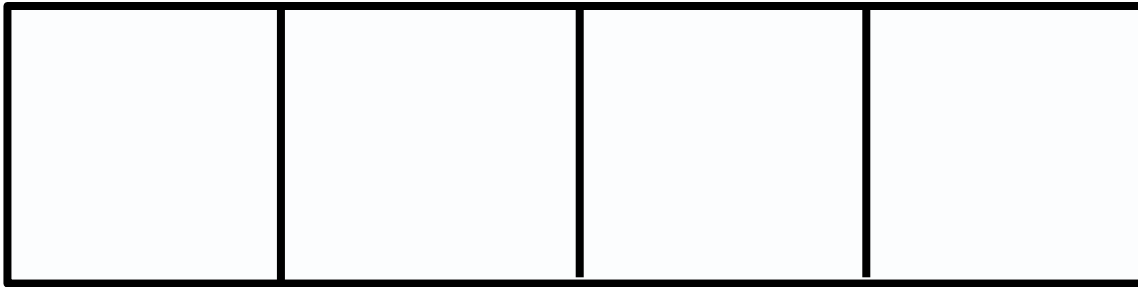
$$\frac{3}{4} \div 2 =$$



Can we simplify?

You do

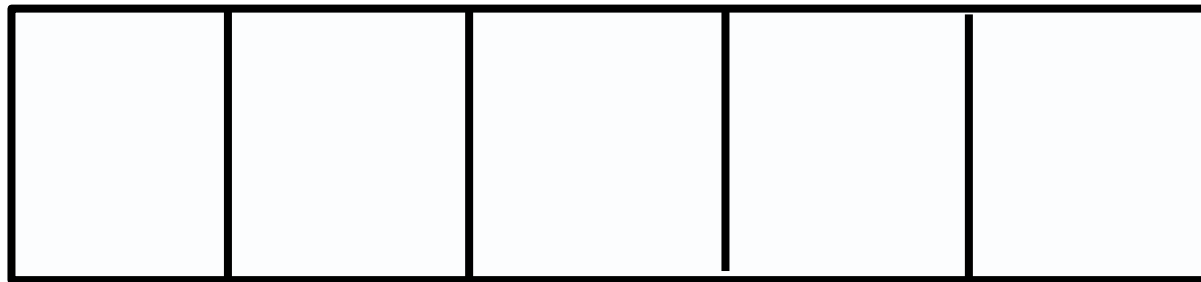
$$\frac{3}{4} \div 3 =$$



Can we simplify?

You do

$$\frac{2}{5} \div 2 =$$



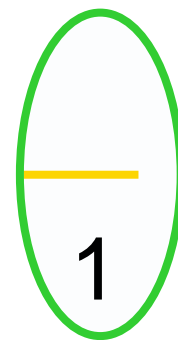
Can we simplify?

$$\frac{1}{5} \div 3$$

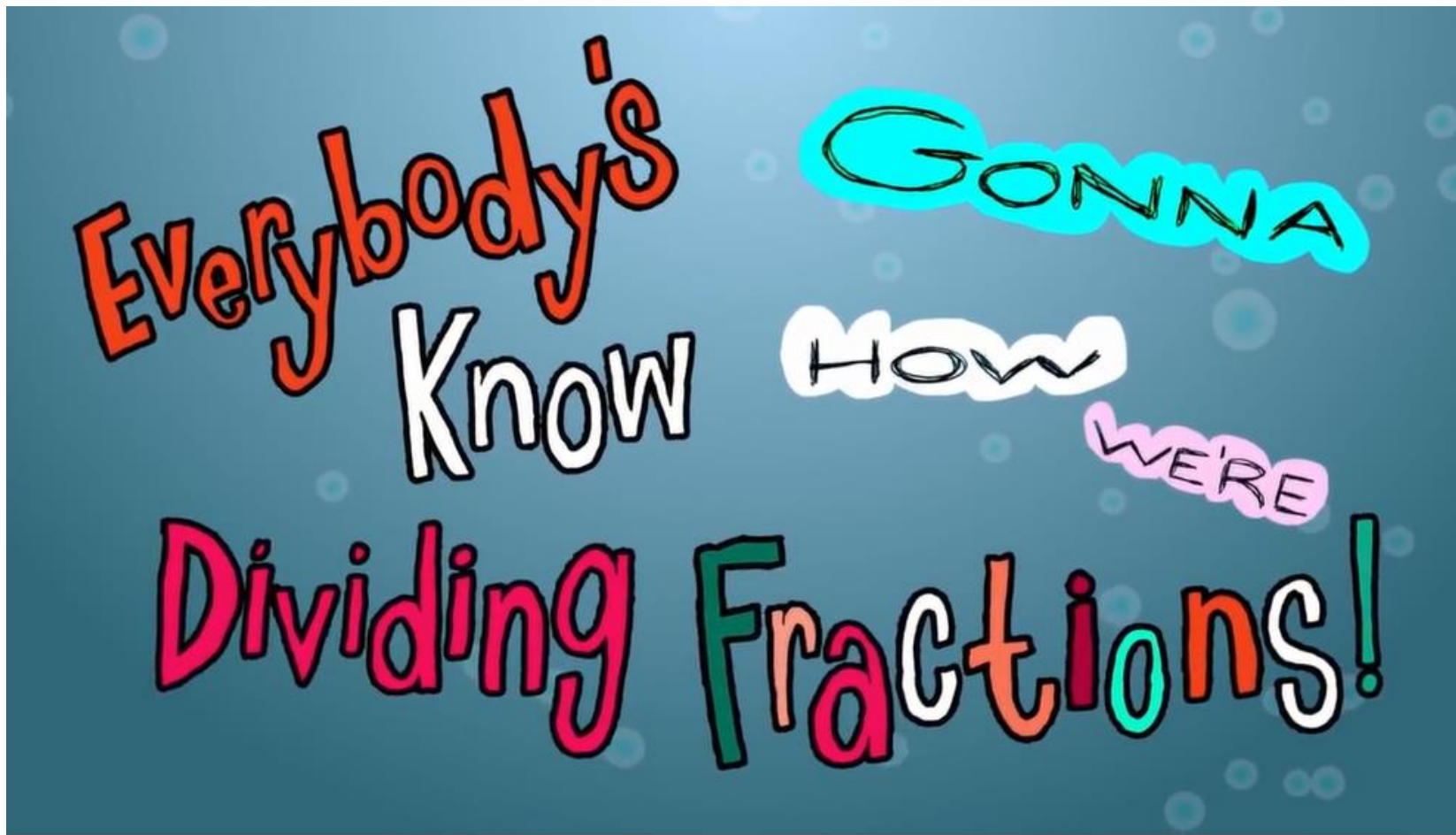


$$\frac{1}{5} \div \frac{3}{1}$$

So 3 wholes is 3



Keep / Change / Flip



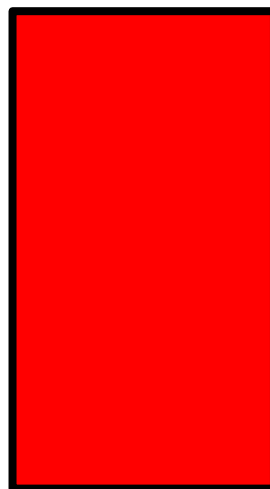
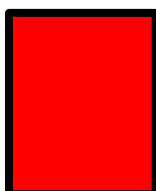
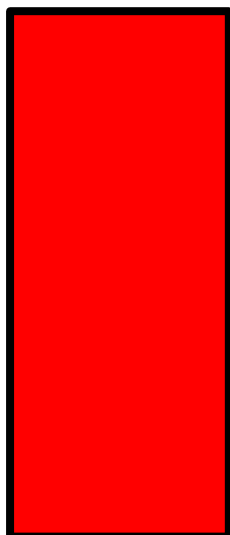
$$\frac{1}{5}$$

÷

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



*cancel*



In all our lessons we challenge our pupils with reasoning questions through out to reinforce application of concepts learnt during the lesson.

Ginny is multiplying the following

sum:  $\frac{1}{5} \times \frac{1}{6}$ .

The answer she gets is  $\frac{2}{30}$ .

Explain what she has done.



Thank you!

Thank you for your attention.  
We hope that this session was useful.  
Please complete the evaluation form to help us with future  
training.