Year 5 fractions, decimals and percentages
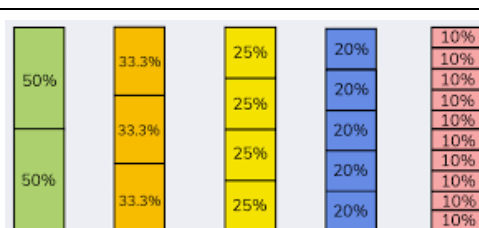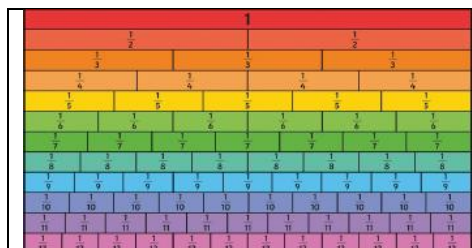
Prior Knowledge
Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators (Y3)
Recognise and show, using diagrams, equivalent fractions with small denominators (Y3)
Compare and order unit fractions, and fractions with the same denominators (Y3)
Recognise and show, using diagrams, families of common equivalent fractions (Y4)
Count up and down in hundredths; recognise that hundredths arise when dividing an object by a 100 and dividing tenths by 10 (Y3&4)
Add and subtract fractions with the same denominator (Y3&4)
Recognise and write decimal equivalents of any number of tenths or hundredths (Y4)
Recognise and write decimal equivalents to ¼; ½; ¾ (Y4)
Find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths (Y4)
Round decimals with 1 decimal place to the nearest whole number (Y4)
Compare numbers with the same number of decimal places up to 2 decimal places (Y4)
Solve simple measure and money problems involving fractions and decimals to 2 decimal places (Y4)

fractions, decimals and percentages	Working Towards	Within	Expected	Above
Compare and order fractions whose denominators are all multiples of the same number				
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				
Add and subtract fractions with the same denominator and denominators that are multiples of the same number				
Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams				
Read and write decimal numbers as fractions				
Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents				
Round decimals with 2 decimal places to the nearest whole number and to 1 decimal place				
Read, write, order and compare numbers with up to 3 decimal places				
Solve problems involving number up to 3 decimal places				
Recognise the per cent symbol (%) and understand that per cent relates to "number of parts per 100", and write percentages as a fraction with denominator 100, and as a decimal fraction				
Solve problems which require knowing percentage and decimal equivalents of 1/2, 1/4, 1/5, 2/5, 4/5 and fractions with a denominator of a multiple of 10 or 25				

Highlights: _____

_____

Resources

Glossary

vocabulary	word class	definition
whole	noun	a thing that is complete
fraction	noun	a numerical quantity that is not a whole number (e.g. 1/2, 0.5)
half	noun	either of two equal or corresponding parts into which something is or can be divided
equal	adjective	being the same in quantity, size, degree, or value
quarter	noun	each of four equal or corresponding parts into which something is or can be divided
third	number	each of three equal parts into which something is or may be divided
tenth	number	each of ten equal parts into which something is or may be divided
unit fraction		A unit fraction is any fraction with 1 as its numerator (top number), and a whole number for the denominator (bottom number)
non-unit fraction		A non-unit fraction is a fraction with a numerator (top number) greater than 1. They could be proper fractions (less than 1 whole, where the denominator (bottom number) is larger than the numerator) or improper fractions
denominator	noun	the number below the line in a vulgar fraction; a divisor
numerator	noun	the number above the line in a vulgar fraction showing how many of the parts indicated by the denominator are taken, for example, 2 in 2/3
hundredth		each of one hundred equal parts into which something is or may be divided
equivalent	adjective	equal in value
decimal	adjective	relating to or denoting a system of numbers and arithmetic based on the number ten, tenth parts, and powers of ten
decimal	adjective	a fraction whose denominator is a power of ten and whose numerator is expressed by figures placed to the right of a decimal point
mixed number	noun	a number consisting of an integer and a proper fraction
integer	noun	a number which is not a fraction; a whole number
improper fraction	noun	a fraction in which the numerator is greater than the denominator, such as 5/4
thousandth		one of a thousand equal parts of something
per cent	noun	one part in every hundred

Equivalent Fractions:
Fractions which have the same value.

Adding and Subtracting Fractions:
When the denominators are the same, you simply add or subtract the numerators.

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

When the denominators are not the same, find the lowest common denominator and rewrite the fractions. Then, add or subtract the numerators.

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

Multiplying Fractions:
When multiplying a proper fraction, multiply the numerator by the multiplier.

$$\frac{2}{3} \times 5 = \frac{10}{3} = 3\frac{1}{3}$$

Round to the nearest whole number: Round to a number which has no digits beyond the ones place holder. For example, 2, 45, 70.

Round to one decimal place: Round to a number which has no digits beyond the tenths place holder. For example, 2.3, 45.1, 70.4

Mixed Numbers
Mixed numbers contain a whole number and a fraction.

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

$2\frac{1}{4}$ is a mixed number.

The whole number is 2.

The fraction is $\frac{1}{4}$.

Improper Fractions
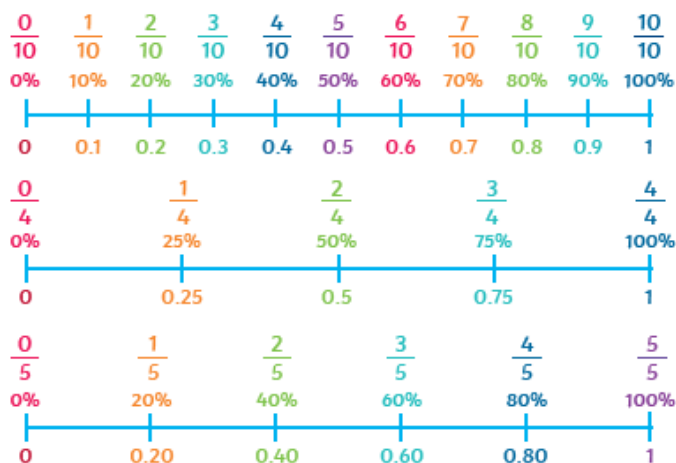An improper fraction is a fraction where the numerator is greater than or equal to the denominator.

5 ← numerator
—
3 ← denominator

Round to two decimal place: Round to a number which has no digits beyond the hundredths place holder. For example, 2.31, 45.19, 70.44

$$\frac{0}{10} \quad \frac{1}{10} \quad \frac{2}{10} \quad \frac{3}{10} \quad \frac{4}{10} \quad \frac{5}{10} \quad \frac{6}{10} \quad \frac{7}{10} \quad \frac{8}{10} \quad \frac{9}{10} \quad \frac{10}{10}$$

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

0   0.1   0.2   0.3   0.4   0.5   0.6   0.7   0.8   0.9   1

$$\frac{0}{4} \qquad \frac{1}{4} \qquad \frac{2}{4} \qquad \frac{3}{4} \qquad \frac{4}{4}$$

0%   25%   50%   75%   100%

0   0.25   0.5   0.75   1

$$\frac{0}{5} \qquad \frac{1}{5} \qquad \frac{2}{5} \qquad \frac{3}{5} \qquad \frac{4}{5} \qquad \frac{5}{5}$$

0%   20%   40%   60%   80%   100%

0   0.20   0.40   0.60   0.80   1

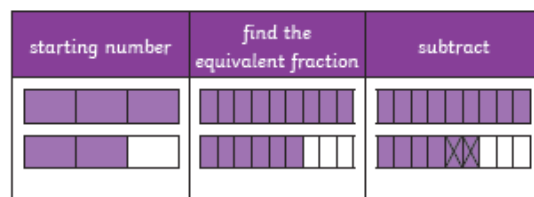| 1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
11%	12%	13%	14%	15%	16%	17%	19%	19%	20%
21%	22%	23%	24%	24%	26%	26%	28%	29%	30%
31%	32%	33%	34%	35%	36%	37%	38%	29%	40%
41%	42%	43%	44%	45%	46%	47%	48%	49%	50%
51%	52%	53%	54%	55%	56%	57%	58%	59%	50%
61%	62%	63%	64%	65%	66%	67%	68%	69%	70%
71%	72%	73%	74%	75%	76%	77%	78%	79%	80%
81%	82%	83%	84%	85%	86%	87%	88%	89%	90%
91%	92%	93%	94%	95%	96%	97%	98%	99%	100%

Add Fractions Where the Total is Greater Than 1

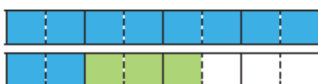$$\frac{1}{2} + \frac{3}{4} + \frac{5}{8} = \frac{4}{8} + \frac{6}{8} + \frac{5}{8} = \frac{15}{8} = 1\frac{7}{8}$$
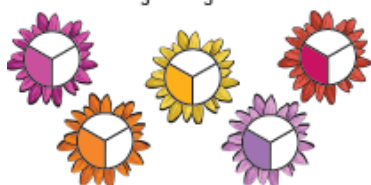

Add Mixed Numbers

$$1\frac{1}{4} + \frac{3}{8} = 1\frac{2}{8} + \frac{3}{8} = 1 + \frac{5}{8} = 1\frac{5}{8}$$

$$1\frac{1}{4} + \frac{3}{8} = \frac{5}{4} + \frac{3}{8} = \frac{10}{8} + \frac{3}{8} = \frac{13}{8} = 1\frac{5}{8}$$
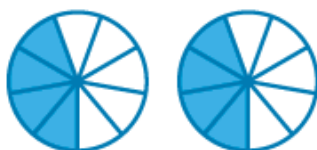

Subtract from a Mixed Number

$$1\frac{2}{3} - \frac{2}{9} = 1\frac{6}{9} - \frac{2}{9} = 1\frac{4}{9}$$

starting number	find the equivalent fraction	subtract

Multiply Unit Fractions by an Integer

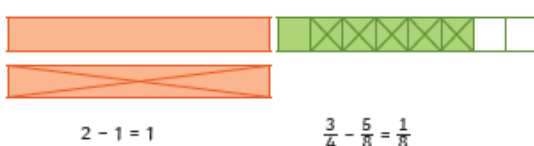$$\frac{1}{3} \times 5 = \frac{5}{3}$$

Multiply Non-Unit Fractions by an Integer

$$2 \times \frac{4}{9} = \frac{8}{9}$$

Subtract Two Mixed Numbers

$$2\frac{3}{4} - 1\frac{5}{8} = 1\frac{1}{8}$$

$$2 - 1 = 1 \qquad \frac{3}{4} - \frac{5}{8} = \frac{1}{8}$$

Multiply Mixed Numbers by Integers

Convert to an improper fraction and multiply the numerator by the integer.

$$2\frac{1}{4} \times 2 \;=\; \frac{9}{4} \times 2 \;=\; \frac{18}{4} \;=\; 4\frac{2}{4} \;=\; 4\frac{1}{2}$$

Use repeated addition.

$$2\frac{1}{4} \times 2 = 2\frac{1}{4} + 2\frac{1}{4} = 4\frac{2}{4} = 4\frac{1}{2}$$
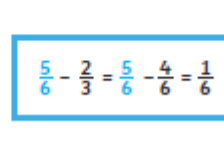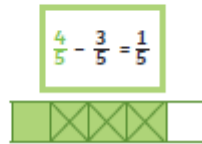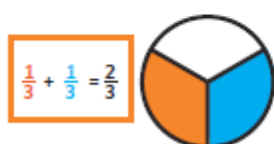
Subtract from a Mixed Number - Breaking the Whole

$$2\frac{1}{4} - \frac{3}{8} = 2\frac{2}{8} - \frac{3}{8} = 1\frac{10}{8} - \frac{3}{8} = 1\frac{7}{8}$$
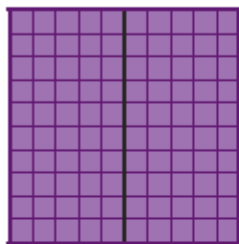

Adding and Subtracting Fractions

To add or subtract fractions with denominators that are multiples of the same number, we must change one fraction to have the same denominator.

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

$$\frac{4}{5} - \frac{3}{5} = \frac{1}{5}$$

$$\frac{1}{4} + \frac{3}{8} = \frac{2}{8} + \frac{3}{8} = \frac{5}{8}$$

$$\frac{5}{6} - \frac{2}{3} = \frac{5}{6} - \frac{4}{6} = \frac{1}{6}$$

Equivalent Fractions

To find equivalent fractions, we multiply or divide the numerator and denominator by the same number.

$$\times 5 \qquad \times 10$$
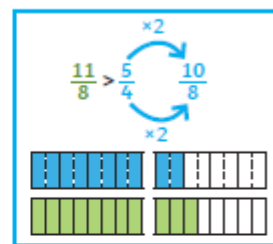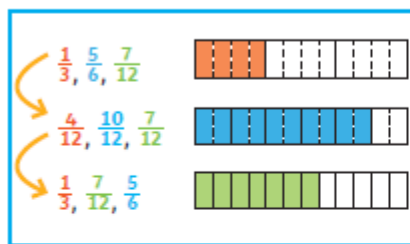$$\frac{1}{2} = \frac{5}{10} = \frac{50}{100}$$
$$\times 5 \qquad \times 10$$

Compare and Order Fractions

We can compare and order fractions by using common denominators.

$$\frac{1}{3}, \frac{5}{6}, \frac{7}{12}$$
$$\frac{4}{12}, \frac{10}{12}, \frac{7}{12}$$
$$\frac{1}{3}, \frac{7}{12}, \frac{5}{6}$$

$$\times 2$$
$$\frac{11}{8} > \frac{5}{4} \qquad \frac{10}{8}$$
$$\times 2$$

Mixed Numbers

Mixed numbers contain a whole number and a fraction.

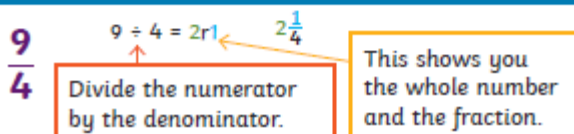whole $\rightarrow 2\frac{1}{4} \leftarrow$ fraction
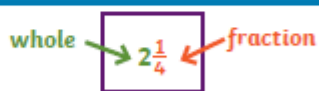
Improper Fractions

An improper fraction has a numerator which is greater than or equal to the denominator.

$$\frac{5}{3}$$

Convert an Improper Fraction to a Mixed Number

$$\frac{9}{4}$$

$9 \div 4 = 2r1 \qquad 2\frac{1}{4}$

Divide the numerator by the denominator.

This shows you the whole number and the fraction.

Convert a Mixed Number to an Improper Fraction

Multiply the whole by the denominator to make an improper fraction.

$$2\frac{5}{6} = \frac{12}{6} + \frac{5}{6} = \frac{17}{6}$$

Add the fractions together.

Future Learning

Year 6 fractions decimals and percentages
Use common factors to simplify fractions; use common multiples to express fractions in the same denomination
Compare and order fractions, including fractions >1
Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions
Multiply simple pairs of proper fractions, writing the answer in its simplest form
Divide proper fractions by whole numbers
Associate a fraction with division and calculate decimal fraction equivalents for a simple fraction.
Identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1,000 giving answers are up to three decimal places
Multiply one-digit numbers with up to 2 decimal places by whole numbers
Use written division methods in cases where the answer has up to 2 decimal places
Solve problems which require answers to be rounded to specified degrees of accuracy
Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts