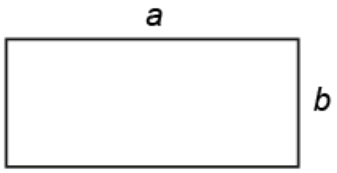
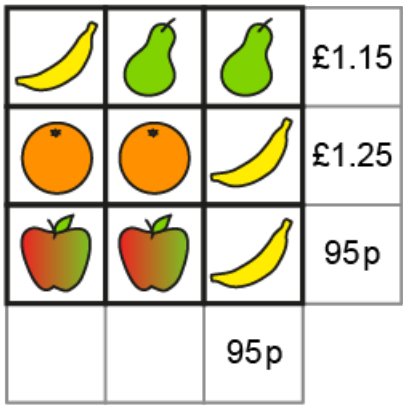


6. The diagram shows the total cost of the items in each row and column. Fill in the 2 missing costs.



6F–1 Simplify fractions

Recognise when fractions can be simplified, and use common factors to simplify fractions.

6F–1 Teaching guidance

In year 5, pupils learnt to find equivalent fractions (**5F–2**). Now pupils must build on this and learn to recognise when fractions are not in their simplest form. They should use their understanding of common factors (**5MD–2**) to simplify fractions.

Pupils should learn that when the numerator and denominator of a fraction have no common factors (other than 1) then the fraction is in its simplest form. Pupils should learn that a fraction can be simplified by dividing both the numerator and denominator by a common factor. They must realise that simplifying a fraction does not change its value, and the simplified fraction has the same position in the linear number system as the original fraction. Pupils should begin with fractions where the numerator and denominator have only one common factor other than 1, for example $\frac{6}{15}$.

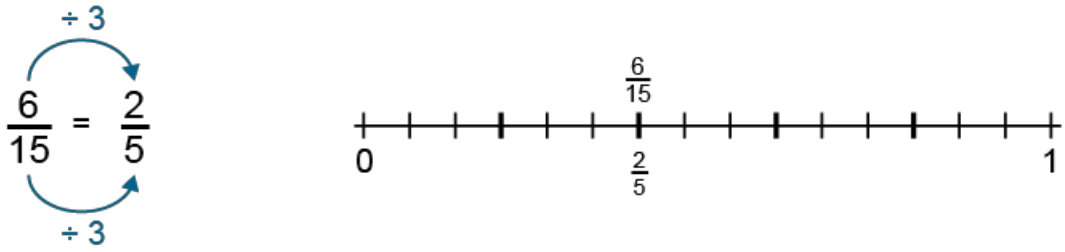


Figure 225: simplifying $\frac{6}{15}$ by dividing the numerator and denominator by the common factor of 3

Language focus

"A fraction can be simplified when the numerator and denominator have a common factor other than 1."

Pupils should then learn to simplify fractions where the numerator and denominator share several common factors, for example $\frac{4}{12}$. Pupils should understand that they should divide the numerator and denominator by the highest common factor to express a fraction in its simplest form, but that the simplification can also be performed in more than 1 step.

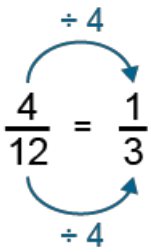


Figure 226: simplifying $\frac{4}{12}$ by dividing the numerator and denominator by the highest common factor

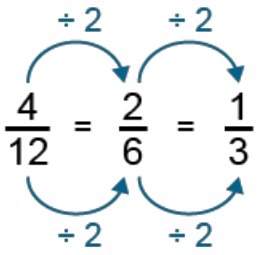


Figure 227: simplifying $\frac{4}{12}$ in 2 steps

Language focus

"To convert a fraction to its simplest form, divide both the numerator and the denominator by their highest common factor."

Pupils should learn to always check their answer when simplifying a fraction to confirm that it is in its simplest form and the only remaining common factor is 1.

Pupils should be able to simplify fractions:

- where the numerator is a factor of the denominator (and therefore also the highest common factor), for example, $\frac{3}{9}$ or $\frac{7}{28}$, resulting in a simplified fraction that is a unit fraction
- where the numerator is not a factor of the denominator, for example, $\frac{4}{14}$ or $\frac{15}{20}$, resulting in a simplified fraction that is a non-unit fraction

In year 4 pupils learnt to convert between mixed numbers and improper fractions (**4F–2**) and to add and subtract fractions to give a sum greater than 1 (**4F–3**). This criterion on simplifying fractions provides an opportunity for pupils to continue to practise these skills as they learn how to simplify fractions with a value greater than 1.

Pupils should consider calculations such as $\frac{9}{12}+\frac{11}{12}$ and understand that the resulting improper fraction, $\frac{20}{12}$, can be simplified either directly, or by first converting to a mixed number and then simplifying the fractional part.

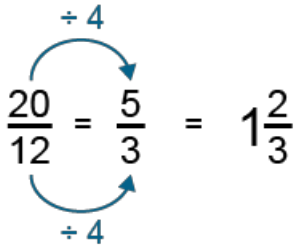


Figure 228: simplifying $\frac{20}{12}$ to $\frac{5}{3}$, then converting to a mixed number

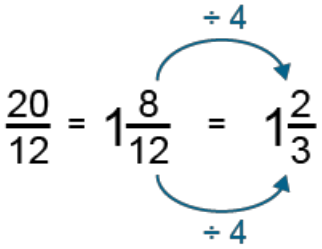


Figure 229: converting $\frac{20}{12}$ to $\frac{5}{3}$, then simplifying

6F–1 Example assessment questions

1. Sort these fractions according to whether they are expressed in their simplest form or not.

$\frac{3}{15}$ $\frac{2}{5}$ $\frac{4}{20}$ $\frac{25}{36}$ $\frac{1}{6}$ $\frac{7}{21}$ $\frac{18}{30}$ $\frac{9}{17}$ $\frac{5}{15}$ $\frac{11}{20}$ $\frac{23}{30}$

Fraction in its simplest form	Fraction <u>not</u> in its simplest form

2. Solve these calculations, giving each answer in the simplest form.

$\frac{2}{9}+\frac{4}{9}$ $\frac{3}{7}-\frac{1}{7}$ $\frac{4}{15}+\frac{2}{15}$

$\frac{5}{12}+\frac{5}{12}-\frac{2}{12}$ $\frac{2}{13}+\frac{7}{13}-\frac{4}{13}$ $\frac{4}{5}+\frac{4}{5}$

$\frac{7}{10}+\frac{5}{10}+\frac{3}{10}$ $\frac{8}{9}+\frac{8}{9}-\frac{1}{9}$ $3\frac{7}{10}+2\frac{9}{10}$

$\frac{13}{8}+\frac{11}{8}$ $7\frac{1}{6}-1\frac{2}{6}$ $\frac{17}{3}-\frac{5}{3}$

3. Ahmed says, “To simplify a fraction, you just halve the numerator and halve the denominator.” Is Ahmed’s statement always true, sometimes true or never true? Explain your answer.

4. Put these numbers in order from smallest to largest by simplifying them to unit fractions.

$\frac{3}{18}$ $\frac{5}{20}$ $\frac{4}{8}$ $\frac{2}{18}$ $\frac{4}{12}$ $\frac{6}{60}$

5. How much water is in this beaker? Write your answer as a fraction of a litre in its simplest form.