

Core Focus

- Division: Nines, sixes, and last facts
- Common fractions: Improper fractions
- Common fractions: Equivalent fractions
- Capacity and mass: Fractions of a liter, fractions of a kilogram, and word problems

Division

- Students extend their understanding of $\times 9$ multiplication facts to division facts. The key is to *think* multiplication, and remember how multiplication/division **fact families** are formed.
- Arrays can model the relationship between multiplication and division by showing the total and how many rows there are, or how many are in each row.

8.1 Division: Introducing the nines facts

Step In What are some nines multiplication facts that you know?

Look at the picture below. What number is covered?

$9 \times \square = 45$ How do you know?

What do you know about this array?

How could you figure out the number of dots in each row?

Write the multiplication fact and division fact that you would use to calculate the number of dots in each row.

$\square \times \square = \square$ $\square \div \square = \square$

How would you use multiplication to calculate $36 \div 9$?

27 dots in total

In this lesson, students use nines multiplication to figure out how to divide by 9.

Fractions

- Students consider the relationship between the **numerator** and the **denominator** of **improper fractions**.

8.6 Common fractions: Exploring improper fractions

Step In Two strips of paper are placed side by side. Each strip of paper shows one whole.

How many fourths have been shaded in total? How much greater than one whole is that?

An improper fraction has a numerator that is equal to or greater than the denominator. $\frac{5}{4}$ and $\frac{9}{6}$ are both improper fractions.

- Students visualize fractions using a number line. The denominator tells how the distance between whole numbers (0 to 1, or 1 to 2, etc.) is split; the numerator tells the number of jumps along those dividing marks.

Ideas for Home

- Continue to practice the $\times 9$ facts and make connections to the division facts. Encourage your child to *think* multiplication. E.g. for $63 \div 9$, *think* $9 \times ? = 63$.
- When cooking, use measuring cups and spoons to review equivalency. E.g. $\frac{1}{2}$ cup is equivalent to $\frac{2}{4}$ cup.

Glossary

- Each **fact family** has two multiplication facts and two related division facts, which use the same three numbers. E.g. $9 \times 3 = 27$, $3 \times 9 = 27$, $27 \div 9 = 3$, and $27 \div 3 = 9$ are a fact family using the numbers 9, 3, and 27.
- The top number of a fraction is the **numerator**, the count of equal parts being considered.
- The bottom number of a fraction is the **denominator**, the total number of equal parts in the whole.
- An **improper fraction** has a numerator that is equal to, or greater than, the denominator. E.g. $\frac{6}{6}$ and $\frac{9}{6}$ are both improper fractions.

Helpful videos

View these short one-minute videos to see these ideas in action.

www.bit.ly/OI_29


www.bit.ly/OI_19

- Students use a number line to explore fractions that are beyond one whole.

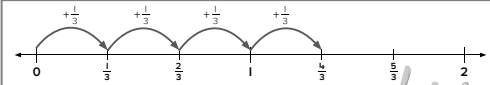
8.7 Common fractions: Identifying improper fractions on a number line

Step In One batch of 12 muffins needs $\frac{2}{3}$ cup of mashed banana.

Maka wants to make 2 batches but he only has a $\frac{1}{3}$ measuring cup. What can he do to measure the correct amount of banana for 2 batches of muffins?

 Maka can use the $\frac{1}{3}$ measuring cup two times for one batch, so he can use it four times for two batches.

How could you show your thinking on a number line?
What fraction could you write to show the total amount of banana?



What do you notice about the fraction $\frac{4}{3}$?

The numerator is greater than the denominator. I can see on the number line that $\frac{4}{3}$ is greater than 1.

In this lesson, students use number lines to explore the additive nature of fractions.

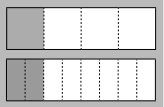
- Area models help students see why a shape's shaded area can be called different fraction names, depending on how many equal parts fill the whole. E.g. $\frac{1}{4}$ and $\frac{2}{8}$ can refer to the same shaded area, so they are **equivalent fractions**.

8.8 Common fractions: Exploring equivalent fractions

Step In The top shape is one whole. What fraction of it is shaded? How do you know?

The bottom shape is also one whole. What fraction of it is shaded?
What do you notice about the two fractions?

What do you notice about the fraction that is shaded in each of these shapes?



Fractions in these pictures are **equivalent** if they cover the same amount of space in each shape.

In this lesson, students find different ways to show the same fractional parts of one whole.

Measurement

- Students practice reading masses (weights) in kilograms and parts of a **kilogram**. They make the connection that reading fractional marks on a scale ($\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$) involves the same skills as reading marks on a number line.
- Since the metric system is based on $\times 10$, it is a convenient real-life context to practice $\times 10$ and fractions of a unit because the numbers are easy to work with.
- Students are introduced to fractions of a **liter**.

Ideas for Home

- Cut a rectangular pan of food (e.g. brownies, lasagna) into rows and columns of equal portions. Count the portions by unit fractions. E.g. if a lasagna is cut into 12 equal pieces, count the pieces of the total lasagna: " $\frac{1}{12}$, $\frac{2}{12}$, $\frac{3}{12}$, ... to $\frac{12}{12}$."
- Practice reading a scale when shopping in the fruit and vegetable aisle. Use the scales to weigh the produce and have your child read the mass (weight) in kilograms (if possible).

Glossary

- Unit fractions** are fractions that have a numerator of 1, e.g. $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{4}$.
- Equivalent fractions** are fractions described in different ways but cover an area that is the same fraction of a whole. E.g. $\frac{3}{4}$ is equivalent to $\frac{6}{8}$.
- There are 1,000 grams (g) in **1 kilogram** (kg).
- There are 1,000 milliliters (mL) in **1 liter** (L).