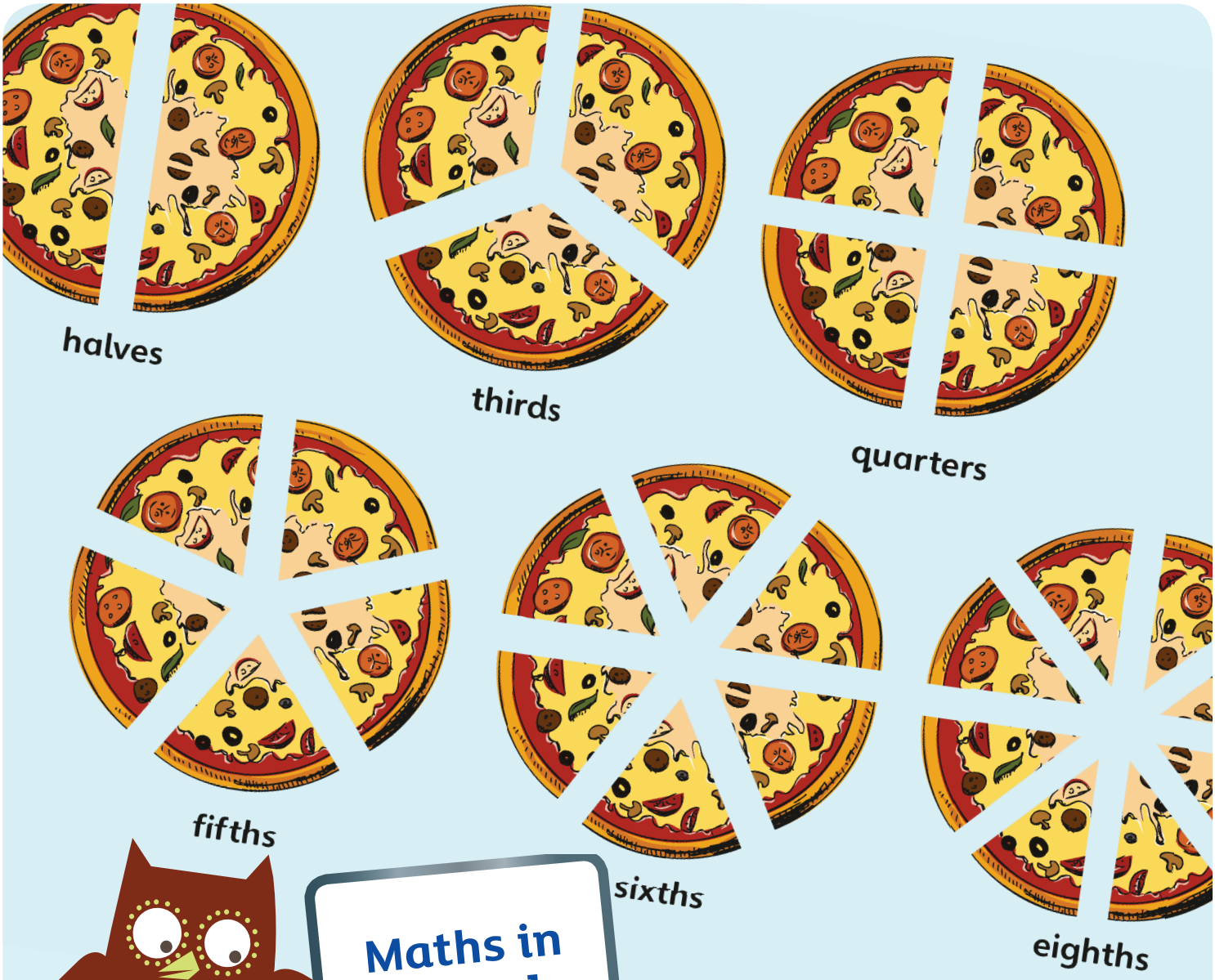

Maths in School

Fractions in School

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Oxford OWL www.oxfordowl.co.uk

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Fractions in School

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Introduction

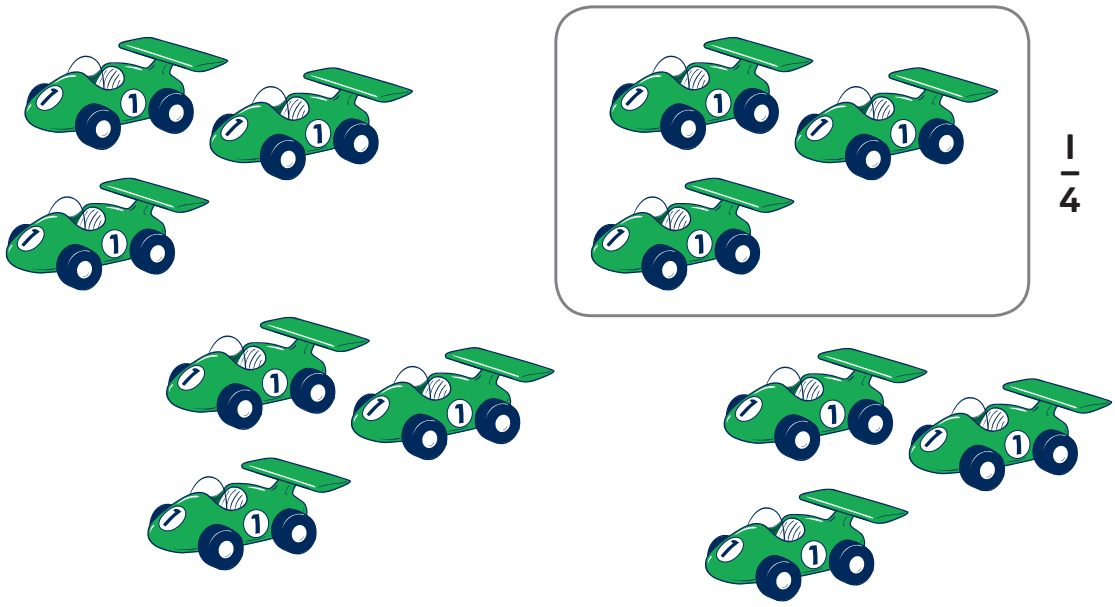
In this booklet, you'll find out how your child is introduced to fractions in school. You'll also find a wide range of games and activities that you can use at home to build your child's skills and confidence in using fractions.

Fractions in everyday life – sharing

Fractions are about sharing. Every time we share food – a pizza or a cake, sausages or some grapes – we can explore fractions.

$\frac{1}{4}$

We can also explore fractions when we share out other things: toys, money, anything that needs to be split up into equal parts.



$\frac{1}{4}$

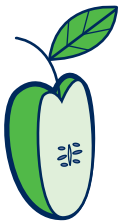
Fractions are part of an object or part of an amount

Your child will be shown that you can find a fraction of an object:

A whole apple

1

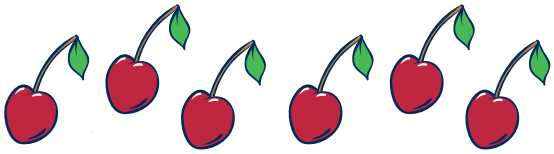
Half an apple



$\frac{1}{2}$

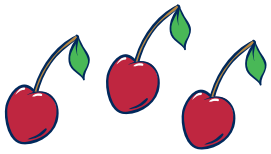
Or a fraction of an amount:

All the cherries



1

Half the cherries



$\frac{1}{2}$

Children begin by learning that to find $\frac{1}{2}$ they need to divide an object or an amount into two equal parts and to find $\frac{1}{4}$, they need to divide into four equal parts.

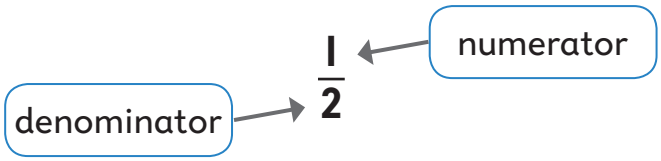
You can:

- *Cut out the pictures on pages 17 and 18 and use them with your child to explore halves and quarters.*
- *Describe to your child the fractions you are making whenever you split food or toys into equal quantities.*

Fraction vocabulary: numerator and denominator

The top number in any fraction is known as the **numerator.**

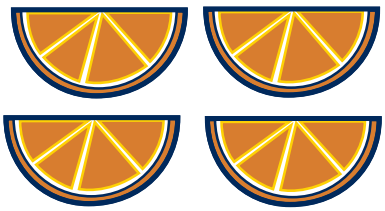
The bottom number is known as the **denominator.**



What the numbers in a fraction mean

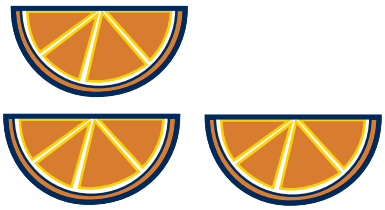
Before children can explore fractions further, they need to understand what the numbers in a fraction mean.

The denominator (bottom number) tells you how many equal pieces the whole thing, or amount, has been split into:



This orange has been split into 4 equal pieces. Each piece is $\frac{1}{4}$.

The numerator (top number) tells us how many of those pieces we have:



The orange was split into 4 equal pieces. We have 3 out of those 4 pieces, so we have $\frac{3}{4}$.

It can be useful to see the line in a fraction as meaning ***'out of'***, so that we read a fraction like this:

$$\frac{3}{4} \qquad \begin{matrix} 3 \\ \text{out of} \\ 4 \end{matrix}$$

You can:

- *Point out to your child the fractions that you see around you in sales (e.g. $\frac{1}{2}$ price), recipes (e.g. $\frac{1}{4}$ tablespoon) and so on. Discuss what the different numbers mean.*

Finding a fraction of an object

During their early primary years, your child will first practise finding fractions of an object:

To find $\frac{5}{6}$ of a pizza, we first cut it into **6** equal pieces ...

... and then we take **5** of those pieces.

So, to find a fraction of an object:

Split it into the number of pieces shown by the denominator.

Take the same number of pieces as in the numerator.

Finding a fraction of an amount

Children also use this method to find a fraction of an amount. The denominator tells them how many equal portions to split the amount into. The numerator tells them how many of those portions to take.

We've made 20 cakes. We've decided to take $\frac{3}{4}$ to sell at the school fete, and to eat the rest. So we need to find out: What's $\frac{3}{4}$ of 20?

The denominator tells us how many equal piles to split the **20** cakes into. So we split them into **4** equal piles: there are **5** in each pile.

We can just say 20 ÷ 4 = 5.

The numerator tells us how many of those piles we need. So we gather **3** of those piles together.

The **3** piles contain **15** cakes altogether.

We can just say 5 × 3 = 15.

$\frac{3}{4}$ of 20 is 15, so we'll take 15 cakes to the school fete.

So, to find a fraction of an amount:

First, divide the amount by the denominator (bottom number).

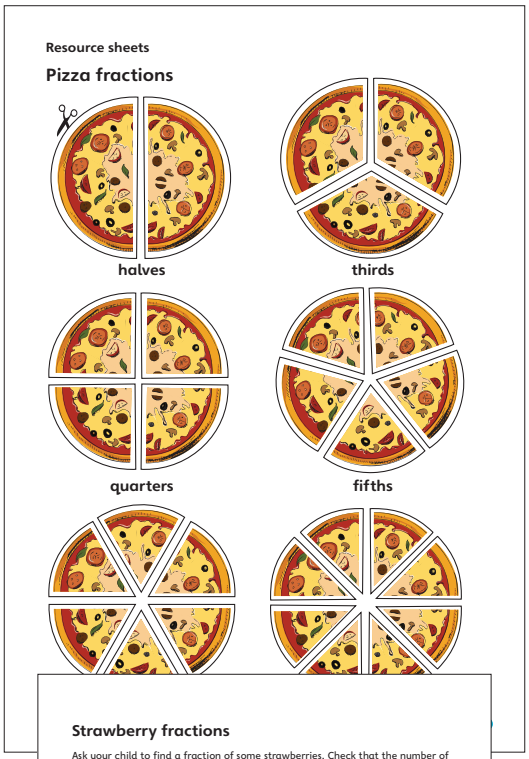
Then, multiply the answer by the numerator (top number).

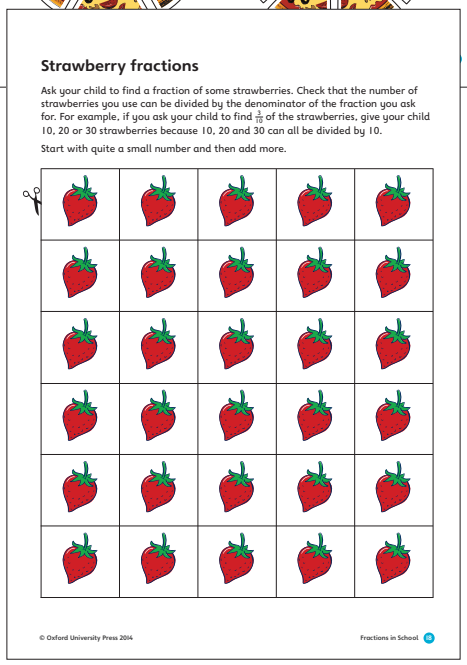
A quick way to remember this is:

Divide by the denominator, multiply by the numerator.

You can:

- *Cut out the pictures on pages 17 and 18 and help your child to find fractions of a pizza or of an amount of strawberries.*
- *Try the Cupcake Fractions game in the Fun Activities part of our website.*
- *Encourage your child to find a range of fractions of objects and amounts that you are using in your daily lives, e.g. toys, food, counters and so on.*





Which fractions make one whole?

Children explore which fractions are the same as one whole.
Look at these pizzas:

two halves

$\frac{2}{2}$

four quarters

$\frac{4}{4}$

five fifths

$\frac{5}{5}$

eight eighths

$\frac{8}{8}$

twelve twelfths

$\frac{12}{12}$

Because the denominator of a fraction tells us how many slices one whole pizza has been cut into, we need exactly that number of slices (as shown by the numerator of that fraction) to make one whole pizza. If the denominator and the numerator of a fraction are the same, the fraction always equals one whole.

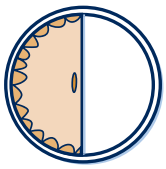
You can:

- *Cut out the pizza slices on page 17 and ask your child:*

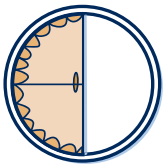
  Can you see the fractions that each pizza is cut into? Can you tell me how many of the fractions are needed to make each whole pizza? Can you see a pattern (e.g. a pizza split into fifths needs $\frac{5}{5}$; a pizza cut into sixths needs $\frac{6}{6}$ and so on)?

Equivalent fractions

Your child will learn that, sometimes, different fractions can represent the same amount. We call these equivalent fractions.



I have $\frac{1}{2}$ *a pie*



You have $\frac{2}{4}$ *of a pie*

We have the same amount of pie. $\frac{1}{2}$ and $\frac{2}{4}$ are equivalent fractions.

At first, your child will learn about equivalent fractions by looking at and comparing fractions of things, like the pies above, to see if they look like the same total amount.

You can:

- *Cut out the pizza pictures on page 17 and see if your child can find any equivalent fractions of pizza. For example, can they see that* $\frac{1}{2}$ *and* $\frac{2}{4}$ *are the same amount of pizza or that* $\frac{1}{3}$ *and* $\frac{2}{6}$ *are the same amount?*

Your child will then be shown a mathematical way of finding two fractions that are equivalent:

Fractions are equivalent if you can turn one into the other by multiplying, or dividing, both the top and bottom by ***the same number***.

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

As long as we do exactly the same to the top and bottom (multiplying or dividing by the same number), the fractions will be equivalent. Here are some more examples:

$$\frac{1}{2} \overset{\times 3}{=} \frac{3}{6}$$

$$\frac{2}{6} \overset{\div 2}{=} \frac{1}{3}$$

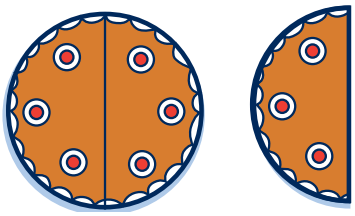
$$\frac{3}{15} \overset{\div 3}{=} \frac{1}{5}$$

You can:

- *Help your child to identify and remember some common equivalent fractions by playing the Fraction Match game together. You'll find this in the Fun Activities section of our website.*

Proper and improper (top-heavy) fractions

Later on in primary school, children learn that a fraction can sometimes represent more than one whole thing:



$\frac{3}{2}$ of cake

The denominator tells us how many pieces one whole cake has been split into. The numerator tells us how many pieces we have. So, when the numerator is higher than the denominator, we have more than one whole cake.

Fractions that represent more than one whole thing are called ***improper*** fractions. They are also sometimes called top-heavy fractions because the top number is always bigger (or 'heavier') than the bottom number.

To contrast with improper fractions, fractions that represent ***less*** than one whole – where the numerator is smaller than the denominator – are sometimes known as ***proper fractions***.

You can:

- *Print two or three copies of page 17 and see if your child can find improper fractions of pizza.*

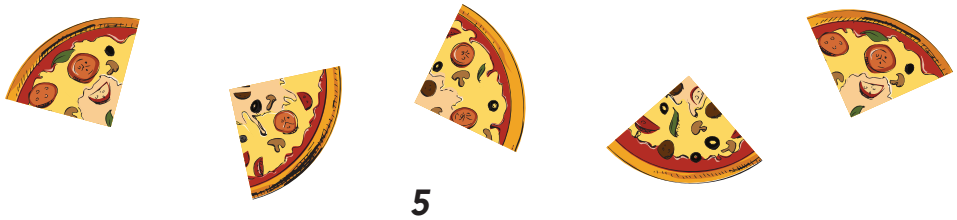
Mixed numbers

Mixed numbers (or mixed fractions) are numbers that include whole numbers and proper fractions. Here are some examples of mixed numbers:

$1\frac{1}{2}$ $3\frac{4}{5}$ $7\frac{5}{14}$ $29\frac{3}{4}$

Turning improper fractions into mixed numbers

Children learn to change improper fractions into mixed numbers:



We have 5 quarters of pizza or $\frac{5}{4}$.

- To find out how many whole pizzas we have, and how many extra parts, we start by looking at the denominator of the fraction. This number (**4**) tell us how many slices each whole pizza has been cut into. So we need **4** slices to make one whole pizza.
- Therefore we can ask:

How many lots of 4 in 5? and how many left over?

There is one lot of 4 in 5 and 1 left over

So, we have:

1 whole pizza and one quarter of a pizza

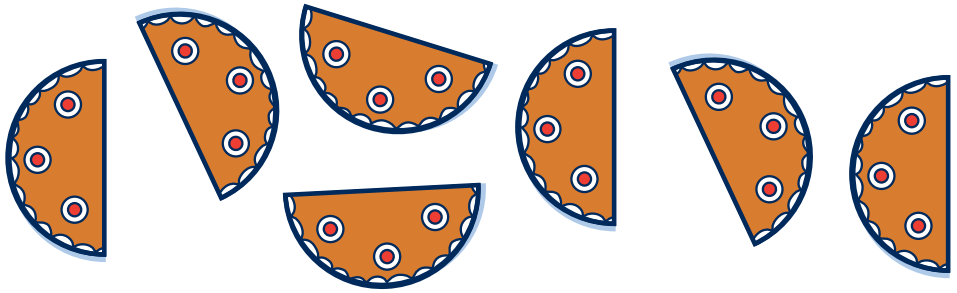
$$\frac{5}{4} = 1\frac{1}{4} \text{ pizza}$$

So, to turn an improper fraction into a mixed number:

Divide the top number of the fraction by the bottom number to see how many whole things there are.

Then find the remainder to see how many additional parts of a whole we have.

Here's another example:



$\frac{7}{2}$ of cake

To turn this into a mixed number we say:

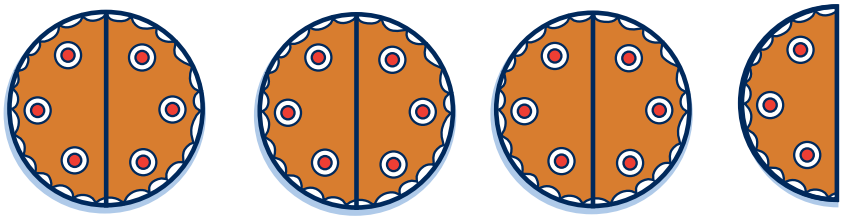
7 ÷ 2 = 3

(that's how many whole cakes we have)

There's **1** left over

(that's how many further halves we have)

So, we have $3\frac{1}{2}$ cakes



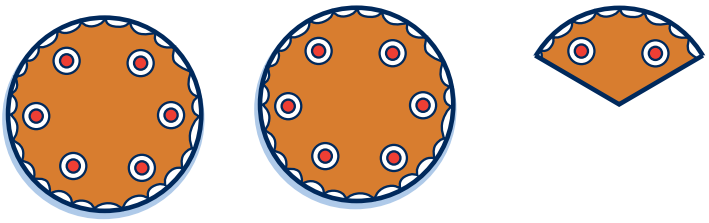
You can:

- *Print three or four copies of page 17 and ask your child to gather a number of pizza slices to make an improper fraction. Can they now use these slices to show a mixed fraction? Can your child write down a mathematical way to reach the same answer?*

Turning mixed numbers into improper fractions

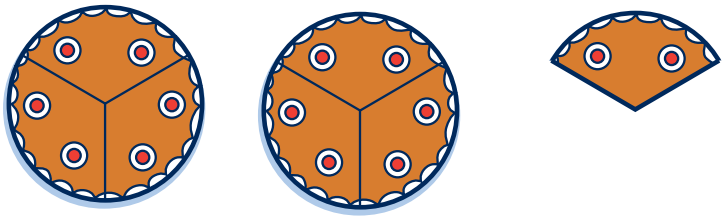
We sometimes also need to change fractions the other way – from mixed numbers into improper fractions. To do this we just reverse the process:

We want to sell these cakes in one third slices.



We have $2\frac{1}{3}$ cakes altogether. How many thirds is that?

- Each of the 2 whole cakes can be split into 3 thirds:



- So we have: **2 × 3 + 1 = 7**

2 lots of 3 thirds + the extra 1 third ($\frac{1}{3}$) = 7 thirds

$\frac{7}{3}$ of cake

So, to turn a mixed number into an improper fraction:

Multiply the whole number by the bottom number in the fraction.

Add this to the top number in the fraction.

You can:

- *Play the Mixed and improper fraction pairs game (on pages 15 and 16) with your child.*

Mixed and improper fraction pairs game

Cut out each of the cards and use them to play Pairs:

Pairs (two or more players)

Place all cards face down on the table.

In turns, turn over two cards and see if they match, e.g. $1\frac{1}{2}$ card and its matching improper fraction ($\frac{3}{2}$).

If they match, keep the pair. If they don't, turn them back over.

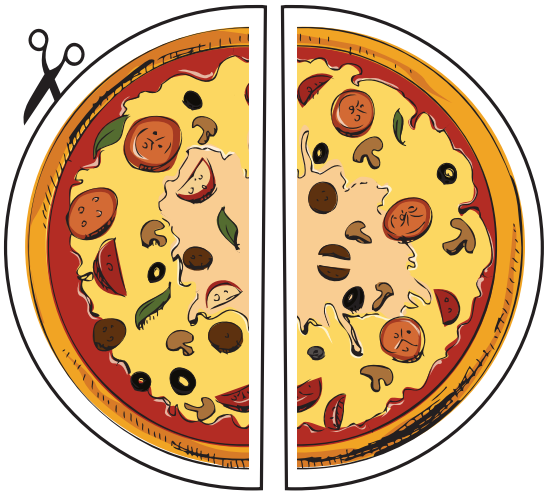
The winner is the person with the most pairs.

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

Mixed and improper fraction pairs game
(continued)

$3\frac{1}{3}$	$\frac{10}{3}$
$1\frac{1}{4}$	$\frac{5}{4}$
$1\frac{3}{4}$	$\frac{7}{4}$
$2\frac{3}{4}$	$\frac{11}{4}$
$1\frac{4}{5}$	$\frac{9}{5}$
$2\frac{1}{5}$	$\frac{11}{5}$
$2\frac{3}{5}$	$\frac{13}{5}$

Pizza fractions



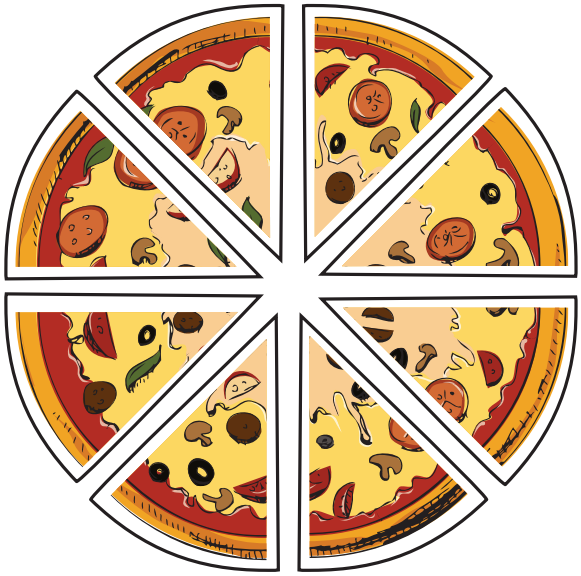
halves

thirds

quarters

fifths

sixths



eighths

Strawberry fractions

Ask your child to find a fraction of some strawberries. Check that the number of strawberries you use can be divided by the denominator of the fraction you ask for. For example, if you ask your child to find $\frac{3}{10}$ of the strawberries, give your child 10, 20 or 30 strawberries because 10, 20 and 30 can all be divided by 10.

Start with quite a small number and then add more.