Fractions

This document is part of a set that forms the subject knowledge content audit for Key Stage 1 and Key Stage 2 maths. Each document contains: audit questions with tick boxes that you can select to show how confident you are (1 = not at all confident, 2 = not very confident, 3 = fairly confident, 4 = very confident), exemplifications; explanations; and further support links. At the end of each document, there is space to type notes to capture your learning and implications for practice. The document can then be saved for your records.

Question 6

How confident are you that you understand and can support children to recognise that non-unit fractions are multiples of unit fractions?

1 ☐   2 ☐   3 ☐   4 ☐

How would you respond …?

a. **Pawel is sharing his orange with Dominka.**

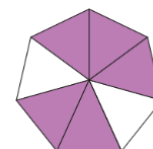Pawel   Dominika

What fraction does Pawel have?

What fraction does Dominika have?

b. **Which of these representations shows $\frac{5}{7}$ shaded?**

Responses

Note your responses to the questions here before you engage with the rest of this section:

Did you notice that…?

a. The orange is divided into eight equal parts. Pawel has five parts; he has five-eighths of the whole. Dominika has three parts; she has three-eighths of the whole.

b. Each of these images has been carefully designed to expose potential misconceptions. In the rectangle, there are five parts shaded and seven parts unshaded. There needs to be seven parts in the whole, so this is not correct. The hearts do have seven in the whole but only two are shaded; we are asked to find $\frac{5}{7}$ shaded so this is not correct. The heptagon has seven equal parts and five of those parts are shaded so this is correct.

Recognising non-unit fractions are multiples of unit fractions

Non-unit fractions are introduced through their connection to unit fractions. They are simply 'multiples' of unit fractions. For example, five-sixths is five <u>one</u>-sixths, or five units of $\frac{1}{6}$. It is useful to make this connection, to support children in transferring what they already know about unit fractions to non-unit fractions. To support this understanding, it is important to use the dual language of '*five-sixths*' and '*five one-sixths*'.

The clear emphasis on unitising throughout is vital to prepare children for subsequent learning, involving adding fractions, converting mixed numbers into improper fractions and vice versa.

A helpful starting point, when introducing children to this concept, is to count in the unit fraction, with a supporting representation such as a counting stick.

The stick is the whole, so each part is $\frac{1}{10}$. Count up the stick and down again: '*One one-tenth, two one- tenths, three one-tenths,*' etc.

Point to various places along the counting stick and ask, '*What fraction of the whole am I pointing to?*'

Make the link from three one-tenths to three tenths by using a stem sentence, such as: '*I have ____ one-tenths; I have ____-tenths.*'

- Show an image of a hexagon divided into sixths. A hexagon is helpful as the language of sixth is closer to the language of six. Count the sixths: '*One one-sixth, two one-sixths, three one-sixths, four one-sixths, five one-sixths, six one-sixths.*'

- The same image can also be used with different parts shaded. For example, '*I have two one-sixths; I have two-sixths.*'

- Repeat for different numbers of sixths, asking children to complete the following stem sentence each time: '*I have ____ one-sixths; I have ____-sixths.*'

'
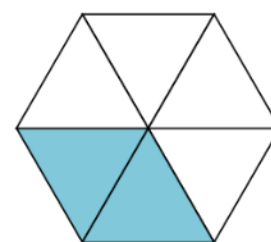
To support children in applying their thinking, ensure the visual representations are varied and move between linear, quantity and area representations. It is important to include area models where the whole is

- not a regular shape
- not one clearly defined shape.
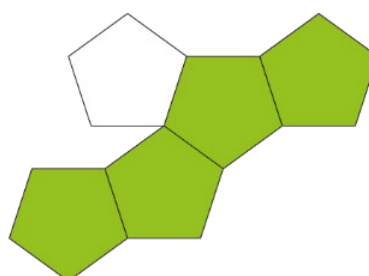
Children will also need to be introduced to the notation for writing non-unit fractions. This can be done using the same language structure as unit fractions:

	Say	**Write**
$\dfrac{5}{6}$	*'The whole has been divided…'*	The division bar: **–**
	'…into six equal parts.'	The denominator: **6**
	'Five of the parts has been shaded.'	The numerator: **5**

It is important to clarify children's understanding of the notation using simple questioning around the name of the fraction and its newly introduced notation, such as:

- *'What does the '6' represent?'*
- *'What does the '5' represent?'*

Children will need lots of opportunities to recognise non unit fractions in real-life contexts. For example:

'Carly was playing football and accidentally broke some panes of glass in a window. What fraction of the whole window will need new window panes?'
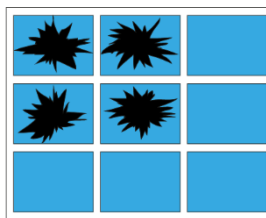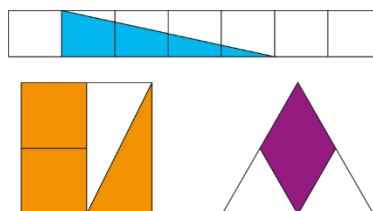

Include more than just one part shaded and one part not.

Also, ensure there are plenty of examples where the parts are not congruent.

'What fraction of each whole is shaded?'

Common errors in this area may include:

- children not understanding the denominator as the unit size; this is critical to them being able to calculate with fractions in subsequent learning.

What to look for

Can a child:
- describe the fraction as a multiple of the unit fraction, e.g. 'I have five one-sixths' and as a non- unit fraction *'I have five-sixths'*?

Links to supporting materials:

NCETM Primary Professional Development materials, Spine 3: Fractions:
- Topic 3.3: Non-Unit Fractions: Identifying, Representing and Comparing

Notes:

Key learning from support material and self-study:

What I will focus on developing in my classroom practice: