Supporting Year 6 Teachers and Pupils

KS2 Mathematics Tests

Fractions

Norfolk County Council

Fractions

One of the topics identified through our analysis, to contribute to several marks in the KS2 tests is 'Fractions'. This topic encompasses a wide range of objectives, so for the purposes of supporting your targeted teaching and revision we have narrowed these down to a small number of crucial objectives.

- Addition of fractions with different denominators.
- Subtraction of fractions with different denominators and a mixed number.
- Order mixed numbers and improper fractions or fractions & decimals, using equivalences.
- Multiply a fraction by a two digit number.
- Divide a fraction by a one digit number.

To support your focused teaching on revisiting, reshaping, and challenging your pupils learning on this already taught content. We have provided a range of misconceptions which may need to be addressed for your pupils to progress their learning in this topic.

One

Misconception: $\frac{1}{2}$ is always in the middle of a number line.

Problem: Pupils' previous experience is likely to have involved halving shapes where a line has been drawn down the middle. This generalisation is then applied to finding fractions on a number line, rather than seeing fractions as a number value, between the scale on the number line.

Solution: Use the visual representation of a fraction number line to support pupils in understanding where fractions are marked on the number line, depending on the scale. Alongside this use a counting stick to support understanding of counting in fractions and identifying fractions as a value between whole numbers. Ensure pupils experience marking unit fractions, proper fractions and mixed numbers, on number lines with different scales. Paper strips, Fraction strips/blocks and a double number line can also be used to support the visualisation and understanding of identifying fractions.

Two

Misconception: $\frac{2}{5} + \frac{1}{2} = \frac{3}{7}$

Problem: Treating the numerators and denominators as whole numbers and not as the parts they represent; then applying the rules of addition for whole numbers.

Solution: Model using a visual representation of fraction strips/blocks the size of $\frac{2}{5}$ and a $\frac{1}{2}$, placed next to each other and then compare this to the size of $\frac{3}{7}$; this helps to dispel this misconception. Use fraction strips/blocks to find equivalences of fractions and then move to finding common fractions, which two fractions can be converted into e.g., common denominator. Once this understanding is secure, progress to using fraction strips/blocks to model how to add fractions with the same denominator and then fractions with different denominators by finding a common denominator. A fraction wall, double number lines and a multiplication square can be also used to support the understanding of equivalent fractions and finding a common denominator.

Three

Misconception: $\frac{1}{4}$ is larger than $\frac{1}{3}$

Problem: The denominator of 4 in $\frac{1}{4}$ is read as a whole number, and as 4 is larger than 3, then $\frac{1}{4}$ is the larger than $\frac{1}{3}$.

Solution: To dispel this misconception, model the comparison of the size of $\frac{1}{4}$ and $\frac{1}{3}$ using a visual representation such as fraction strips/blocks. Pupils need to have exposure to a variety of representations to compares sizes of a range of unit fractions and then proper fractions. This can then be modelled further using fraction strips/blocks to show how to convert fractions using equivalence fractions and linking with common multiples, to find a common denominator, in order to compare the two fractions. Fraction plates, fraction squares, paper strips, double number lines and Cuisenaire rods can all be used to support the visualisation and understanding of comparing fractions.

Four

Misconception: $\frac{3}{12}$ can be simplified as $\frac{1.5}{6}$

Problem: When first introduced or only experience in simplifying fractions, they divide by 2 each time. Then a generalisation is made that all fractions are simplified by dividing by 2.

Solution: Explore first introducing this concept, use a range of fractions, that can be simplified by dividing by numbers other than 2. Use a visual representation such as fraction strips/blocks to model how to convert fractions, into finding equivalent fractions and linking with common factors, therefore finding the fraction in the simplest form. Cuisenaire rods, a fraction wall and a double number line can be used to support the visualisation and understanding of simplifying fractions.

Five

Misconception: $\frac{3}{4}$ x $\frac{1}{5}$ does not equal $\frac{3}{20}$

Problem: Treating the numerators and denominators as whole numbers and not as the parts they represent; then applying the rules of multiplication for whole numbers. Added to this may be the generalisation that multiplication always makes a number bigger; whilst this is true for whole numbers, this is not always the case for fractions.

Solution: It is advantageous to remind pupils that multiplication is commutative and how ‘of’ and the multiplication symbol and are synonymous. Use a pictorial representation such as Bar model or Area model to demonstrate that the calculation means $\frac{3}{4}$ of $\frac{1}{5}$ or $\frac{1}{5}$ of $\frac{3}{4}$, to support pupils’ understanding. Paper strips, Arrays and Number lines can be used to support the visualisation and understanding of multiplying fractions.

I've got some questions... No problem, we're here to help.

Rose Keating and Sarah Penfold, Mathematics Advisers, and our experienced team are here to help you provide the best Mathematics education possible. We will be happy to answer your questions and/or discuss your bespoke needs.

Please contact us:

Email: **assessment@norfolk.gov.uk**

Call: **01603 306407**

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