Examples of Key Advances from Grade 3 to Grade 4

- In grade 3, students studied multiplication in terms of equal groups, arrays and area. In grade 4, students extend their concept of multiplication to make multiplicative comparisons **(4.OA.1)**.[1]
- Students in grade 4 apply and extend their understanding of the meanings and properties of addition and subtraction of whole numbers to extend addition and subtraction to fractions **(4.NF.3)**.[2]
- Fraction equivalence is an important theme within the standards that begins in grade 3. In grade 4, students extend their understanding of fraction equivalence to the general case, $a/b = (n \times a)/(n \times b)$ **(3.NF.3 -> 4.NF.1)**.[3] They apply this understanding to compare fractions in the general case **(3.NF.3d -> 3.NF.2)**.
- Students in grade 4 apply and extend their understanding of the meanings and properties of multiplication of whole numbers to multiply a fraction by a whole number **(4.NF.4)**.
- Students in grade 4 begin using the four operations to solve word problems involving measurement quantities such as liquid volume, mass and time **(4.MD.2)**.
- Students combine their understanding of the meanings and properties of multiplication and division with their understanding of base-ten units to begin to multiply and divide multidigit numbers (**4.NBT.5**-**6**; this builds on work done in grade 3, cf. **3.NBT.3**).
- Students generalize their previous understanding of place value for multidigit whole numbers **(4.NBT.1-3)**. This supports their work in multidigit multiplication and division, carrying forward into grade 5, when students will extend place value to decimals.

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[1] In an additive comparison problem (grades 1-2), the underlying question is *what amount would be added to one quantity to result in the other?* In a multiplicative comparison problem, the underlying question is *what factor would multiply one quantity to result in the other?*

[2] This work is limited to equal denominators in grade 4 to give students more time to build their understanding of fraction equivalence, before adding and subtracting unlike denominators in grade 5.

[3] Students who can generate equivalent fractions can also develop strategies for adding fractions with different denominators, but this is not a requirement in grade 4.