**This Learning Progression begins at Level 6 of the Victorian Curriculum and concludes at Level 10. Six progressions are provided in this span.**

*Description:* This Learning Progression focuses on understanding the use of percentages in representing quantities. It begins with understanding the concept of a percentage, progresses through calculations of a percentage, finding a percentage change first through two steps (calculating the percentage and adding or subtracting) before progressing to one-step methods (10% increase in cost is achieved by multiplying by 1.1) and then to calculating multiple changes. The multiplicative nature of percentages coupled with the practice of frequently only implying the quantity the percentage refers to can lead to an incomplete understanding of percentages. Addition and subtraction are inverse operations, yet increasing a price by 10%, followed by decreasing by 10%, does not return to the original price.

*Related Numeracy Learning Progressions:* This Learning Progression relates to *Comparing units (ratios, rates and proportion)* Learning Progression.

*Details of progression provide nuanced and detailed descriptions of student learning – what students can say, do, make or write. Examples of student learning in each step are not hierarchical, nor are they to be used as a checklist.*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Victorian Curriculum Level 6** | |  | | | | **Victorian Curriculum Level 10** | |
| **Understanding percentages and relative size**  The student:   * interprets per cent as meaning ‘out of 100’ * recognises that 100% is a complete whole * interprets a percentage as an operator (percentage is of an amount, 17% of $80, 17% does not exist alone without its referent) * uses percentages to describe and compare relative size (select which beaker is 75% full, describes an object as 50% larger) * represents relative size of percentages of an amount. | **Find percentage as a part of a whole**  The student:   * uses fraction benchmarks to find percentages of quantities (to find 75% of 160, I know that 50% (half) of 160 is 80, and 25% (quarter) is 40 so 75% is 120) * finds a percentage of a quantity (10%, 20%, 25%, 50%, 75% and multiples of these) * multiplies to calculate a percentage of any amount (finds 13% of 160) * finds percentages of quantities and expresses one quantity as a percentage of another (finds 20% of $13 and determines what percentage $13 is of $20). | | **Find a part of a whole as a percentage**  The student:   * uses a strategy to find a percentage that represents part of a whole (what per cent is 7 of 28, may use benchmark fractions, or what per cent is 7 of 29, may multiply to calculate). | **Find the whole from a percentage and a part**  The student:   * determines the whole given a percentage (given 20% is 13 mL, determines the whole is 65 mL) * identifies the whole for a range of multiplicative situations (percentages for calculating discounts and rates for best buys). | **Adding a percentage as multiplying**  The student:   * increases and decreases quantities by a percentage (to determine discounts and mark-ups) * uses percentages to calculate simple interest on loans and investments * recognises that adding a percentage is equivalent to multiplication (adding 3% is multiplying by 1.03). | | **Repeatedly adding a percentage**  The student:   * uses percentage increases or decreases as an operator (a 3% increase is achieved by multiplying 1.03, and 4 successive increases is multiplying by 1.034) * chooses appropriate strategies for problems in a range of multiplicative situations (percentage of a percentage for calculating successive discounts) * uses percentages to calculate compound interest on loans and investments * evaluates, critically, claims based on numerical multiplicative operations (Why is a 10% increase followed by a 10% discount different from the original price?). | |

Student learning in numeracy has links beyond Mathematics in the Victorian Curriculum F–10. Teachers are encouraged to identify links within their teaching and learning plans.