**This Learning Progression begins at Level 7 of the Victorian Curriculum and concludes at Level 9. Three progressions are provided in this span.**

*Description:* This Learning Progression addresses comparing units in ratios, rates and proportions. A ratio describes a situation in comparative terms, and a proportion is taken to mean when this comparison is used to describe a related situation in the same comparative terms. For example, if the ratio of boys to girls in a class is 2 to 3, the comparison is the number of boys to the number of girls. Knowing that there are 30 children in the class, proportionally, the number of boys is 12 and the number of girls is 18. Applying the base comparison to the whole situation uses proportional reasoning. Proportional reasoning is knowing the multiplicative relationship between the base ratio and the proportional situation to which it is applied.

Learning to reason using proportion is a complex process that develops over an extended time. Proportional reasoning also includes numerical comparison tasks involving a comparison of different rates or ratios. For example, if one dog grows from 5 kilograms to 8 kilograms and another dog grows from 3 kilograms to 6 kilograms, which dog grew more?

*Related Numeracy Learning Progressions:* This Learning Progression also supports the Learning Progressions of *Measurement*, *Interpreting fractions* and *Interpreting and representing data.*

*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.*

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| **Victorian Curriculum Level 7** |  | **Victorian Curriculum Level 9** |
| **Building ratios** The student: * uses knowledge of fractions as part-whole relationships to divide and compare quantities
* represents and model ratios using diagrams or objects (in a ratio 1:4 of red to blue counters, for each red counter there are four blue counters).
 | **Ratios** The student: * interprets ratios as a comparison between the same units of measure (students to teachers in a school is 20:1)
* expresses a ratio as equivalent fractions or percentages (ratio 1:1, each part represents ½ or 50% of the whole)
* uses a ratio to increase or decrease quantities to maintain a given consistency (doubling a recipe).
 | **Applying proportion** The student:* interprets proportion as the equality of two ratios or rates
* uses common fractions and decimals for proportional division
* demonstrates how increasing one quantity in a ratio will affect the total proportion
* performs operations with negative integers involving rates (rates of descent or cooling)
* explains and applies the difference between direct and indirect proportion (direct – working more hours will result in earning more money; indirect – travelling at a greater speed will mean the journey takes less time).
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| **Rates** The student:* interprets rates as a relationship between two different types of quantities (money per unit of fuel)
* uses rates to determine how quantities change.
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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.