PERCENTAGES - SUMMARY

For Year Level 8

This material relates to the following Australian Curriculum (Mathematics) Outcome/s:

Solve problems involving the use of percentages, including percentage increases and decreases, with and without digital technologies (ACMNA187).

Rationale for Use

It is expected that students will have access to an array of practice material in the form of textbooks or school prepared exercises. The purpose of the AMSI materials is to support the development of **understanding** and **reasoning** about the concepts involved. They complement and enhance the teacher instruction elements of normal classroom instruction.

Explanation (What this includes):

Percentages describe a proportion of a numerical amount as a rate or ratio out of 100. Percentage increases and decreases change a quantity by that rate. We can use mental, written and calculator methods to calculate percentage changes.

Real-life problems involving percentages include percentage composition problems, problems involving money, interpreting nutritional information on product packaging and changes in environmental measures such as energy use for different purposes.

Working effectively with percentages will mean students are able to recognise equivalences when calculating percentage increases and decreases (e.g. multiplication by 1.05 means an increase in a number or quantity by 5%, and multiplication by 0.87 means a decrease in a number or quantity by 13%).

Students should be able to use the 'unitary method' to solve problems such as finding the original value after a percentage increase or decrease of 20%, and to interpret calculator displays when solving problems involving percentages (including rounding decimal places).

Resources:

1. **Explore the AMSI Interactive, 'Percentages'** – provided as a link with this Unit.

2. **Read and explore** the AMSI Schools **'The Improving Mathematics Education in Schools (TIMES) Project module** 'Decimals and Percentages': http://www.amsi.org.au/ESA_middle_years/Year8/Year8_md/Year8_1c.html. (Click on the section in the Contents labelled 'Percentages', or, if you have downloaded the PDF version of the Module, skip to Page 14 for the 'Percentages' section).

Although this module was written as teacher support material, it is also very accessible for students – it shows exactly how to use percentages expressed as a fraction out of 100, to find a percentage change in any real number.

3. **Watch some handy online videoclips:**
   - Professor Dave Explains – Working With Percentages: https://www.youtube.com/watch?v=n9fgcm0Pwgs;
   - Australian Mathematics Curriculum Videos – Year 8 Maths Unitary Method Percentages: https://www.youtube.com/watch?v=90FrLzYgR14;
   - Eddie Woo – The Unitary Method (1 of 2: Introduction and Example): https://www.youtube.com/watch?v=OAlLmEi4GXc; and
   - Eddie Woo – The Unitary Method (2 of 2): Potato Puzzle): https://www.youtube.com/watch?v=ZOuqBqzEEck.

4. **Play some games and solve some problems!** Here are a few ideas to have fun with percentages on the 'NRICH' Mathematics website:
   - 'Fractions and Percentages Card Game' - https://nrich.maths.org/2739 *(Note: although this game refers to 'Pounds and Pence' – as NRICH is a British website – you can assume 'Dollars and Cents' because , like Australian currency, British currency is based on the decimal system, with 100 Pence per Pound, etc.).*
   - Percentage Unchanged' - https://nrich.maths.org/515 – a good percentage problem applied to simple geometry; and
   - 'CD Heaven' - https://nrich.maths.org/849. *The fact that this problem talks about 'CDs' dates it a bit! You can imagine an updated version by pretending that instead of CDs, the store is selling vinyl records.* 😉 *(CDs won't come back into vogue until they're considered sufficiently 'retro' – we think about 2028…)*