Unit Title: *Equations*

Duration: *7 Lessons*

Purpose: An equation is a statement that two quantities or expressions are equal, usually through the use of numbers and/or symbols. Equations are used throughout mathematics and in our daily lives in obtaining solutions to problems of all levels of complexity. People are solving equations (usually mentally) when, for example, they are working out the right quantity of something to buy, or the right amount of an ingredient to use when adapting a recipe.

Outcomes:

A student:

- communicates and connects mathematical ideas using appropriate terminology, diagrams and symbols MA4-1WM
- applies appropriate mathematical techniques to solve problems MA4-2WM
- recognises and explains mathematical relationships using reasoning MA4-3WM
- uses algebraic techniques to solve simple linear and quadratic equations MA4-10NA

Continuum of learning:

Stage 3	Stage 4	Stage 5
	Uses algebraic techniques to solve simple linear and quadratic equations **MA4-10NA**	Solves linear and simple quadratic equations, linear inequalities and linear simultaneous equations, using analytical and graphical techniques **MA5.2-8NA**

Key language:

Pronumeral	Unknown	Variable	Expression	Equation

Sequence of Unit:

#	Content	Teaching and Learning
1	Introduce the concept of variables as a way of representing numbers using letters (ACMNA175) • solve simple linear equations using concrete materials, such as the balance model or cups and counters, stressing the notion of performing the same operation on both sides of an equation • develop the concept that pronumerals (letters) can be used to represent numerical values - recognise that pronumerals can represent one or more numerical values (when more than one numerical value, pronumerals may then be referred to as 'variables') (Communicating, Reasoning)	**Strategies/Activities:** - Using hands on materials e.g. envelopes, paper clips, cups etc. **Resources:** - Year 7 National Curriculum Maths.pdf (chapter 12) - Any relevant Stage 4 textbook - Freefall 8 Chapter 9: Equations and Inequations - https://ies.ed.gov/ncee/wwc/Docs/PracticeGuide/wwc_algebra_040715.pdf - www.amathsdictionaryforkids.com **Adjustments** L: Extra time, use scaffolded worksheets, visiting relevant stage 3 prerequisite H: Introduce variables, model equations using software such as Microsoft excel or GeoGebra/Desmos
2	**One Step – Addition & Subtraction** • solve linear equations that may have non-integer solutions, using algebraic techniques that involve up to two steps in the solution process, eg $x-7=15$ - compare and contrast strategies to solve a variety of linear equations (Communicating, Reasoning) - check solutions to equations by substitution	**Strategies/Activities:** - Have students checking solutions by substitution. **Resources:** - Year 7 National Curriculum Maths.pdf (chapter 12) - Any relevant Stage 4 textbook - Freefall 8 Chapter 9: Equations and Inequations - http://www.projectmaths.ie/documents/T&L/IntroductionToEquations.pdf **Adjustments** L: Revisit directed numbers and order of operations H: Real life modelling and applications, generating equations with a given solution. Using ICT software to aide in the modelling process.

#	Content	Teaching and Learning
3	**<u>One Step – Multiplication & Division</u>** • solve linear equations that may have non-integer solutions, using algebraic techniques that involve up to two steps in the solution process, eg $\frac{x}{7} = 5$ - compare and contrast strategies to solve a variety of linear equations (Communicating, Reasoning) - check solutions to equations by substitution	**Strategies/Activities:** - Have students checking solutions by substitution. **Resources:** - Year 7 National Curriculum Maths.pdf (chapter 12) - Any relevant Stage 4 textbook - Freefall 8 Chapter 9: Equations and Inequations - http://www.projectmaths.ie/documents/T&L/IntroductionToEquations.pdf **Adjustments** L: Revisit directed numbers and order of operations H: Real life modelling and applications, generating equations with a given solution. Using ICT software to aide in the modelling process.
4	**<u>Two Step – With multiplication</u>** • solve linear equations that may have non-integer solutions, using algebraic techniques that involve up to two steps in the solution process, eg $2x - 7 = 15$ $7 - 2x = 15$ - compare and contrast strategies to solve a variety of linear equations (Communicating, Reasoning) - check solutions to equations by substitution	**Strategies/Activities:** - Have students checking solutions by substitution. **Resources:** - Year 7 National Curriculum Maths.pdf (chapter 12) - Any relevant Stage 4 textbook - Freefall 8 Chapter 9: Equations and Inequations - http://www.projectmaths.ie/documents/T&L/IntroductionToEquations.pdf **Adjustments** L: Revisit directed numbers and order of operations H: Real life modelling and applications, generating equations with a given solution. Using ICT software to aide in the modelling process.

#	Content	Teaching and Learning
5	**<u>Two Step – With multiplication & Division</u>** • solve linear equations that may have non-integer solutions, using algebraic techniques that involve up to two steps in the solution process, eg $\frac{2x}{7} = 5$ - compare and contrast strategies to solve a variety of linear equations (Communicating, Reasoning) - check solutions to equations by substitution	**Strategies/Activities:** - Have students checking solutions by substitution. **Resources:** - Year 7 National Curriculum Maths.pdf (chapter 12) - Any relevant Stage 4 textbook - Freefall 8 Chapter 9: Equations and Inequations - http://www.projectmaths.ie/documents/T&L/IntroductionToEquations.pdf **Adjustments** L: Revisit directed numbers and order of operations H: Real life modelling and applications, generating equations with a given solution. Using ICT software to aide in the modelling process.
6	- generate equations with a given solution, eg find equations that have the solution $x = 5$ (Problem Solving)	**Strategies/Activities:** - Have students checking solutions by substitution. - Think – Pair – Share activity. **Resources:** - Any relevant Stage 4 textbook **Adjustments** L: Revisit directed numbers and order of operations. Go through one as a class first to model this. Work together as a class to solve several of these problems. H: Think – Pair – Share activity.

Reflection and Evaluation:

Question	Yes or No	Comment
1. Was the time allocated for this topic appropriate?		
2. Were the aims of this topic appropriate?		
3. Do the topic outcomes adequately reflect the syllabus?		
4. Do the topic outcomes assist in determining whether students have met the objectives of the course?		
5. Does the topic cater for a variety of student needs, interests and abilities?		
6. Does the topic include a variety of teaching and learning activities?		
7. Does the topic adequately integrate QT/Literacy/Numeracy/ICT strategies?		
8. Are the resources for this unit adequate?		
9. Are the assessment tasks adequate for this unit?		
10. Do the assessment tasks assess a range of knowledge and skills?		
11. Did you enjoy teaching this topic?		
12. Did the students enjoy learning throughout this topic?		
13. Were there opportunities for student reflection in this topic?		

14. Are there any changes that you would like to make to the program?