

YEAR 12 – MATHEMATICS

HSC Topic 14 – Differential Equations

MATHEMATICS EXTENSION 1

LEARNING PLAN

Learning Intentions Student is able to:	Learning Experiences Implications, considerations and implementations:	Success Criteria I can:	Resources
<ul style="list-style-type: none"> recognise that an equation involving a derivative is called a differential equation 		recognise and write differential differential equations	
<ul style="list-style-type: none"> recognise that solutions to differential equations are functions and that these solutions may not be unique 		understand that differential equation solutions are functions and that these solutions may not be unique	
<ul style="list-style-type: none"> sketch the graph of a particular solution given a direction field and initial conditions 	<ul style="list-style-type: none"> – form a direction field (slope field) from simple first-order differential equations – recognise the shape of a direction field from several alternatives given the form of a differential equation, and vice versa – sketch several possible solution curves on a given direction field 	sketch graphs of differential equation solutions	<i>GeoGebra</i> – Slope field plotter <i>Desmos</i> – Slope field generator

<ul style="list-style-type: none"> • solve simple first-order differential equations 	<ul style="list-style-type: none"> – solve differential equations of the form $\frac{dy}{dx} = f(x)$ – solve differential equations of the form $\frac{dy}{dx} = g(y)$ – solve differential equations of the form $\frac{dy}{dx} = f(x)g(y)$ using separation of variables 	recognise and solve a variety of first-order differential equations	
<ul style="list-style-type: none"> • recognise the features of a first-order linear differential equation and that exponential growth and decay models are first-order linear differential equations, with known solutions 		model growth and decay using first order differential equations and complete relevant calculations to determine unknown values	
<ul style="list-style-type: none"> • model and solve differential equations including to the logistic equation that will arise in situations where rates are involved, for example in chemistry, biology and economics 		use differential equations to model rates of change in real life applications	

Established Goals(Syllabus Outcomes):

ME12-1, ME12-4, ME12-6, ME12-7

Estimated Time: 1.5 weeks (9 lessons)

Reading Strategies:

Annotate the Question, Vocabulary Pre-Teach + Morphology, Graph/Diagram Decode Routine, Skim–Scan–Select Routine

ASSESSMENT

Performance Tasks: (Linked to Essential Questions)

Other Evidence: