SUBJECT: AP Calculus BC	GRADE: 9-12			
Unit 6: Differential Equations and Methods of Integration	Time Frame: 6 weeks			
UNIT OVERVIEW				
 What are slope fields and how are they used to determine solution graphs? How are differentiable equations solved? What are antiderivatives and how are they used? How are integrals evaluated using u-substitution? How is Euler's Method used? How are integrals of products evaluated using Integration by Parts? How is separation used to solve differential equations? How are exponential differential equations solved and applied? How are logistic differential equations solved and applied? How are logistic differential equations solved and applied? 				
LRG SKILLS AND DISPOSITIONS	PA STANDARDS			
COMPETENCIES	LEARNING TARGETS			
Derivatives and Integrals I can find, interpret, and use derivatives and integrals to solve problems.	 Solving Differential Equations I can analyze differential equations to obtain general and specific solutions. (K1MAB13T29) Estimating Solutions of Differential Equations I can verify and estimate solutions of differential equations. (K1MAB13T30) Slope Fields 			

• I can analyze differential equations by identifying characteristics of their slope fields. (K1MAB13T31)

Find Antiderivatives

• I can find antiderivatives. (K1MAB13T32)

U-Substitution

• I can evaluate indefinite and definite integrals using u-substitution (K1MAB13T33)

Euler's Method

• I can use Euler's Method. (K1MAB13T34)

Integration by Parts

• I can evaluate integrals using integration by parts and partial fraction decomposition. (K1MAB13T41)

Separation of Variables

• I can analyze differential equations to obtain general and specific solutions using separation of variables. (K1MAB13T34)

Exponential Growth

• I can interpret, create, and solve differential equations from problems in context (specifically exponential growth) (K1MAB13T35)

Partial Fraction Decomposition

• I can analyze differential equations to obtain general and specific solutions involving logistic growth. (K1MAB13T42)

Logistic Growth

• I can interpret, create, and solve differential equations from problems in context (specifically logistic growth). (K1MAB13T43)

SUBJECT: AP Calculus BC	GRADE: 9-12		
Unit 7: Applications of Integration	Time Frame: 6 weeks		
UNI	L Γ OVERVIEW		
 How are integrals used to evaluate net change? How are integrals used to find the average value of a function? How are integrals used to calculate areas How are integrals used to calculate volumes? How are lengths of curves calculated? 			
LRG SKILLS AND DISPOSITIONS	PA STANDARDS		
 Collaboration and Teamwork 9-12: Applications of Integration Presentation (S1C) Critical Thinking and Problem Solving 9-12: Applications of Integration Presentation (S4C) 			
COMPETENCIES	LEARNING TARGETS		
Derivatives and Integrals I can find, interpret, and use derivatives and integrals to solve problems.	Integrals as Net Change I can interpret a definite integral as net change of a quantity. (K1MAB13T36) Linear Motion I can apply definite integrals to problems involving linear motion. (K1MAB13T37) Average Value of a Function I can apply definite integrals to problems involving average value of a function. (K1MAB13T38) Area and Volume I can apply definite integrals to problems involving area and volume. (K1MAB13T39) Lengths of Curves		

•	I can apply definite integrals to problems involving length of curves.
	(K1MAB13T44)

SUBJECT: AP Calculus BC	GRADE: 9-12		
Unit 8: L'Hopital's Rule and AP Exam Preparation	Time Frame: 4 week		
U:	NIT OVERVIEW		
How are limits of indeterminant forms evaluated?How are function growth rates compared?How are improper integrals evaluated?			
LRG SKILLS AND DISPOSITIONS	PA STANDARDS		
 Collaboration and Teamwork 9-12: Improper Integrals Presentation (S1C) Critical Thinking and Problem Solving 9-12: Improper Integrals Presentation (S4C) 			
COMPETENCIES	LEARNING TARGETS		
Limits and Continuity I can determine limits and identify continuity of functions.	L'Hopital's Rule I can find limits of indeterminate forms using L'Hopital's Rule. (K1MAB12T9) Function Growth Rates I can use limits to compare function rates of change. (K1MAB12T10)		
Derivatives and Integrals I can find, interpret, and use derivatives and integrals to solve problems.	Improper Integral I can evaluate an improper integral or show that it diverges. (K1MAB13T45)		

SUBJECT: AP Calculus BC	GRADE: 10-12		
Unit 9: Infinite Series	Time Frame: 12 weeks		
UNIT	ΓOVERVIEW		
 How are arithmetic and geometric sequences different and How is sequence divergence and convergence determined? What are series and how is the sum evaluated? How is series convergence and divergence determined? How are power series created and used? How are Taylor Polynomials and Taylor Series generated? What are the Maclaurin series? How are error bounds determined? What are the tests for convergence? 			
LRG SKILLS AND DISPOSITIONS	PA STANDARDS		
 Collaboration and Teamwork 9-12: Series Convergence Presentation (S1C) Critical Thinking and Problem Solving 9-12: Series Convergence Presentation (S4C) 			
COMPETENCIES	LEARNING TARGETS		
Sequences and Series I can identify, describe, and represent various types of sequences and series.	Sequences I can distinguish between arithmetic and geometric sequences. (K1MAB14T1) Rules for Sequences I can write explicit and recursive rules for the nth term of arithmetic and geometric sequences. (K1MAB14T2) Sequence Convergence/Divergence		

• I can determine whether a sequence converges or diverges. (K1MAB14T3)

Series Convergence/Divergence

• I can determine whether a series converges or diverges. (K1MAB14T4)

Sum of a Series

• I can determine or estimate the sum of a series. (K1MAB14T5)

Algebraic Power Series Creation

• I can create a power series by algebraic processes, substitution, and properties of geometric series. (K1MAB14T6)

Calculus Power Series Creation

• I can create a power series by operations on known series such as term-by-term differentiation or integration. (K1MAB14T7)

Taylor Series

• I can write a power series representing a given function using Maclaurin and Taylor series. (K1MAB14T8)

Taylor Polynomials

• I can construct and use Taylor polynomials. (K1MAB14T9)

Maclaurin Series

• I can recognize and use geometric series, Maclaurin series for sinx, cosx, and e^x. (K1MAB14T10)

Lagrange Error Bound

• I can bound the error of a Taylor polynomial using a Lagrange error bound or an alternating series error bound. (K1MAB14T11)

Ratio Test

• I can determine the radius and interval of convergence of a power series using the ratio test. (K1MAB14T12)

Alternating Series Error Bound

• I can bound the error of a Taylor polynomial using an alternating series error bound. (K1MAB14T13)

SUBJECT: AP Calculus BC	GRADE: 10-12		
Unit 10: Parametric, Vector, and Polar Functions	Time Frame: 6 weeks		
UNIT OVERVIEW			
 How are parametric, vector, and polar functions differentiated? How is vector differentiation applied to planar motion? How is vector integration applied to planar motion? How is polar integration applied to find areas between polar curves? 			
LRG SKILLS AND DISPOSITIONS	PA STANDARDS		
 Collaboration and Teamwork 9-12: AP Calculus AB MC random group boardwork practice (D4C) Critical Thinking and Problem Solving 9-12: AP Calculus AB FRQs (S4C) Resilience and Grit 9-12: AP Calculus AB Sim Exam (D4C) 			
COMPETENCIES	LEARNING TARGETS		
Derivatives and Integrals I can find, interpret, and use derivatives and integrals to solve problems.	Parametric, Vector, and Polar Functions ■ I can find derivatives of vector-valued functions, polar functions, and parametric functions. (K1MAB13T46) Vector Differentiation ■ I can solve applications of derivatives involving planar motion. (K1MAB13T47) Vector Integration ■ I can apply definite integrals to problems involving planar motion represented by parametric or vector-valued functions. (K1MAB13T48) Polar Area ■ I can apply definite integrals to problems involving the area between polar curves. (K1MAB13T49)		