EWHS Course Scope & Sequence

Course Title	**AP Calculus AB**				
Course Overview	AP Calculus AB is a college-level math course exploring limits, derivatives, and integrals. Students learn to analyze rates of change, calculate derivatives using rules, and apply them to motion, optimization, and curve behavior. The course then introduces integration to find accumulated quantities and areas, connecting derivatives and integrals through the Fundamental Theorem of Calculus. Emphasis is placed on solving problems graphically, numerically, and analytically, preparing students for the AP exam and real-world applications of calculus.				
Unit Component	**Unit 1**	**Unit 2**	**Unit 3**	**Unit 4**	**Unit 5**
Title	Limits & Continuity	Understanding the Derivative	Rules of Differentiation	Applications of the Derivative - Part 1	Applications of the Derivative - Part 2
Guiding or Essential Questions	1. How can we describe the behavior of a function as it approaches a value, even if it never reaches it? 2. What does it mean for a function to be continuous, and why does continuity matter? 3. How can multiple representations (graphs, tables, and equations) help us understand limits and continuity?	1. How can we determine the instantaneous rate of change of a function at a specific point? 2. What does the derivative tell us about the behavior of a function? 3. How are graphical, numerical, and analytical representations of a function related through its derivative?	1. How can differentiation rules be used to efficiently find the derivative of complex functions? 2. When and why do we choose specific differentiation rules for different types of functions? 3. How do combinations of functions (products, quotients, compositions) affect their rates of change?	1. How can the derivative be used to determine where a function is increasing, decreasing, or at a maximum or minimum? 2. What does the concavity of a function and its points of inflection reveal about the function's behavior? 3. How can derivatives help us interpret and solve real-world problems involving change?	1. How can derivatives be used to find maximum or minimum values in real-world situations? 2. How do related rates describe how changing quantities are interconnected over time? 3. How can derivatives help analyze motion and other dynamic systems to predict outcomes?

Topic This should be the overarching theme or big idea. Brief overview of the unit.	Understanding how functions behave as inputs approach a value, rather than just at the value itself. In simple terms, this unit introduces the foundational idea that calculus is about change and behavior, not just plugging numbers into formulas.	Describing and interpreting instantaneous rate of change of a function. We build on the ideas of limits and continuity to define and explore how things are changing at a specific moment in time.	Derivatives can be computed efficiently using general rules, allowing us to analyze more complex functions quickly and systematically. We build on the ideas of understanding the derivative to focus on how to find the derivative without using the limit definition.	Derivatives can be used to analyze and interpret the behavior of functions in meaningful, real-world and graphical contexts. We build on the ideas of the rules of differentiation to go beyond finding the derivatives and actually using them to understand how functions behave.	Derivatives can be used to solve real-world problems and optimize outcomes by modeling change and analyzing critical points. We build on the ideas of applying the derivative in a fundamental way to applying derivatives in practical situations (e.g. related rates, optimization, & particle motion).
Length *(in weeks)*	3 weeks	3 weeks	4 weeks	4 weeks	4 weeks

Unit Component	Unit 6	Unit 7
Title	Basic Integration & Applications	Advanced Integration & Applications
Guiding or Essential Questions *(if applicable)*	1. How is integration related to differentiation, and how does the Fundamental Theorem of Calculus connect them? 2. How can integrals be used to calculate accumulated quantities, such as area under a curve or total change? 3. What strategies can be used to set up and solve real-world problems involving accumulation and area?	1. How can advanced integration techniques, like substitution, help us find antiderivatives of more complex functions? 2. How can integrals be applied to solve real-world problems involving accumulation, net change, and area? 3. How do different representations—graphical, numerical, and analytical—help us interpret and solve integration problems?
Topic This should be the overarching theme or big idea. Brief overview of the unit.	Integration is the reverse process of differentiation and provides a way to accumulate quantities, allowing us to calculate areas, total change, and other accumulated values.	Integration techniques and applications allow us to solve more complex problems involving accumulation, area, and motion that cannot be handled by basic antiderivatives alone.
Length	4 weeks	4 weeks