Calculus CP Unit 4: Calculating the Derivative

Unit #:	APSDO-00019738	Duration:	4.0 Week(s)	Date(s):	

Team:
Andrew Riddle (Author), Jaclyn Lawlor, Ben Lukowicz, Marlaina Napoli, Steven Rivoira
Grades:
12
Subjects:
Mathematics

Unit Focus

In this unit students will be able to use the definition of the derivative to develop techniques for finding derivatives of several types of functions. With the help of the specific derivative rules such as the power, product, quotient and chain rules, students will be able to compute the derivative of a large variety of functions. Summative assessments may include projects, labs and tests. Primary instructional materials include: Textbook titled Calculus with Applications 8th Edition, by Margaret L. Lial, Raymond N. Greenwell, and Nathan P. Ritchey, and the Calculus in Motion utility based on Geometer's Sketchpad.

Stage 1: Desired Results - Key Understandings

Established Goals

Common Core
Mathematics: 12

- For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. *CCSS.MATH.CONTENT.HSF.IF.B.4*
- Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. *CCSS.MATH.CONTENT.HSF.IF.B.5*
- Calculate and interpret the average rate

Transfer

T1 (T50) Based on an understanding of any problem, initiate a plan, execute it and evaluate the reasonableness of the solution.
T2 (T53) Articulate how mathematical concepts relate to one another in the context of a problem or in the theoretical sense.
T3 (T51) Examine alternate methods to accurately and efficiently solve problems.
T4 (T52) Use appropriate tools strategically to deepen understanding of mathematical concepts.
T5 (T23) Use functions or equations to model relationships among quantities.
T6 (T32) Apply appropriate formulas to determine the unknown.

Meaning

Understandings	Essential Questions
U1 (U561) Recognition of patterns and	**Q1** (Q513) How could this strategy be used to

of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph. *CCSS.MATH.CONTENT.HSF.IF.B.6* • Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data. *CCSS.MATH.CONTENT.HSS.ID.C.7* • Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum. *CCSS.MATH.CONTENT.HSF.IF.C.9*	structures fosters efficiency in solving problems. **U2** (U512) Mathematicians use diagrams, symbols, and terms to describe problems or situations **U3** (U207) Recognition of predictable mathematical patterns supports the analysis of functional relationships and the prediction of data. **U4** (U201) The same value can be represented in multiple ways. **U5** (U201) The same value can be represented in multiple ways.	solve similar problems? **Q2** (Q572) How does understanding the pattern/structure help me solve the problem? **Q3** (Q207) How do I classify, interpret, and compare functions or equations? (Gr. 8-12) **Q4** (Q203) What is the relationship between/among these values?
	Acquisition of Knowledge and Skill	
	Knowledge	**Skills**
		S1 Find the derivative of a function using the definition of derivative **S2** Determine the values of the domain for which a function cannot have a derivative **S3** Use the product rule, quotient rule and chain rule for finding derivatives **S4** Find the derivative of logarithmic functions and exponential functions **S5** Find the derivative of a function that is written implicitly

Stage 3: Learning Plan		
Coding	**Code**	**Description of Learning Activity**