DP AA SL Planner – Unit 3: Analyzing functions with derivatives

Teacher(s)	Jessica Vaughn	**Subject group and course**	Mathematics – Analysis & Approaches		
Course part and topic	Topic 5 – Analyzing functions with derivatives	**SL or HL/Year 1 or 2**	SL, Yr 2	**Dates**	Mid October - December
Unit description and texts		**DP assessment(s) for unit**			
Using derivatives to analyze functions and situations. Oxford AA textbook: Chapter 5: Measuring change: Differentiation		Assessment #5 (5.7-5.8, 2.10-2.11, 3.1) Assessment #6 (5.8-5.9, 3.2-3.4) All assessments will use previous IB exam questions from the Questionbank Summative assessments include spiral review from year 1 content			

INQUIRY: establishing the purpose of the unit

Transfer goals

List here one to three big, overarching, long-term goals for this unit. Transfer goals are the major goals that ask students to "transfer" or apply, their knowledge, skills, and concepts at the end of the unit under new/different circumstances, and on their own without scaffolding from the teacher.

Students should be able to:

- Describe functions using first and second derivative tests.
- Connect derivatives to kinematics – calculate velocity and acceleration from position functions.

ACTION: teaching and learning through inquiry

Content/skills/concepts—essential understandings	**Learning process** *Check the boxes for any pedagogical approaches used during the unit. Aim for a variety of approaches to help facilitate learning.*
<u>Students will know the following content:</u> ● First derivative test to identify intervals of increase/decrease, maximums and minimums. ● Second derivative test to determine points of inflections and concavity. ● Relating first and second derivative of position functions to velocity and acceleration. <u>Students will develop the following skills:</u> ● Use derivatives to analyze functions. ● Take derivatives to solve kinematics problems. <u>Students will grasp the following concepts:</u> ● Derivatives can be used to analyze situations – analytically, graphically, and in real world scenarios.	Learning experiences and strategies/planning for self-supporting learning: ☒Lecture ☐Socratic seminar ☒ Small group/pair work ☒ PowerPoint lecture/notes ☒ Individual presentations ☐ Group presentations ☐ Student lecture/leading ☐ Interdisciplinary learning Details: Each section will start with direct instruction and introduction from the instructor. Students will work in small groups to solve problems and complete explorations. Discussions regarding method, alternate approaches, and efficiency will be regularly included in the class. Teacher will provide multiple resources electronically and in person to support student learning. ☐ Other/s:

	Formative assessment: IB Questionbank Practice problems TOTD – quick checks HW quizzes: function analysis, kinematics

	Summative assessment: Assessment #5 (5.7-5.8, 2.10-2.11, 3.1) Assessment #6 (5.8-5.9, 3.2-3.4) All assessments will use previous IB exam questions from the Questionbank Summative assessments include spiral review from year 1 content
	Differentiation: ☒Affirm identity—build self-esteem ☐Value prior knowledge ☒Scaffold learning ☒ Extend learning Details: Applications of derivatives will build on the concept of derivatives in unit 1. Derivatives will be the focus of most of first semester, so it is important that the concept and all rules are understood. Many representations of derivatives and many resources will be used in class with access to additional resources for students who want or need more practice.
Approaches to learning (ATL) *Check the boxes for any explicit approaches to learning connections made during the unit. For more information on ATL, please see the guide.*	

☒Thinking

☒ Social

☒ Communication

☐ Self-management

☐ Research

Details:

Thinking - making connections within the content and applications

Social – partner work

Communication – utilizing the language and notation of calculus

Language and learning *Check the boxes for any explicit language and learning connections made during the unit. For more information on the IB's approach to language and learning, please see the guide.*	**TOK connections** *Check the boxes for any explicit TOK connections made during the unit*	**CAS connections** *Check the boxes for any explicit CAS connections. If you check any of the boxes, provide a brief note in the "details" section explaining how students engaged in CAS for this unit.*
☐Activating background knowledge ☐ Scaffolding for new learning ☒ Acquisition of new learning through practice ☒ Demonstrating proficiency Details: Applications of derivatives will rely on appropriate set up and notation. The vocabulary and notation will be demonstrated and learned through practice. Multiple notations are commonly accepted in calculus, all will be taught and used throughout the unit. Students will have ample opportunities to utilize the vocabulary and notation in class to get feedback from both the instructor and other students.	☐ Personal and shared knowledge ☐ Ways of knowing ☒ Areas of knowledge ☐ The knowledge framework Details: Students will be applying what they learned in previous units to real world scenarios.	☐ Creativity ☐ Activity ☐ Service Details: N/A
Resources *List and attach (if applicable) any resources used in this unit*		

Textbook - Mathematics: Analysis & Approaches. Chapter 5
IB QuestionBank
Calculus, A Complete Course by Mark Sparks
Master Math Mentor
Khan Academy
Delta Math

Stage 3: Reflection—considering the planning, process and impact of the inquiry

What worked well *List the portions of the unit (content, assessment, planning) that were successful*	**What didn't work well** *List the portions of the unit (content, assessment, planning) that were not as successful as hoped*	**Notes/changes/suggestions:** *List any notes, suggestions, or considerations for the future teaching of this unit*