IB AA HL Yr 2 Unit 1 Topic 5 Calculus Planner

Teacher(s)	Joanna Smith	**Subject group and course**	Mathematics – Analysis and Approaches		
Course part and topic	Unit 1 - Calculus Topic 5: AHL 5.12 - 5.19; AHL 1.11 SL Review 5.1 - 5.11	**SL or HL/Year 1 or 2**	HL, Yr 2	**Dates**	August - September

Unit description and texts	**DP assessment(s) for unit**
Calculus describes rates of change between two variables and the accumulation of limiting areas. The aim of the AHL content in the calculus topic is to extend and build upon the aims, concepts and skills from the SL content. Further powerful techniques and useful applications of differential and integral calculus are introduced. Text – Oxford Mathematics Analysis and Approaches HL (Ch. 4, Ch. 7, Ch. 8)	Summative Assessments - Topic 5 pt. 1 Topic 5 pt. 2 Questions for the cumulative assessments come from released questions in the IB Question bank. Each summative assessment is cumulative by semester with the majority (60-75%) of the test coming from the content covered between summative assessments. Content will also include daily warmup topics from the time period between assessments (review of SL topics)

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: ● Use rates of change (derivatives) and accumulations (integration) to model, interpret and analyze real-world problems and situations. ● Understand the behaviour of functions and interpret the features of their graphs.

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> ● Finding higher derivatives ● Technique of implicit differentiation ● Derivatives and indefinite integrals of tanx, secx, cosecx, cotx, a^x, $\log_a x$, and the inverse trig functions ● Integration by substitution and by parts ● Solve differential equations ● Euler's method <u>Students will develop the following skills:</u> ● Use limits and the definition of derivative from first principles to find the derivative of a function. ● Evaluating limits using l'Hopital's rule or the Maclaurin series ● Interpret and solve optimization and related rates problems. ● Using partial fractions to rearrange an integrand ● Finding the area of a region and volumes of revolution ● Use of simple substitution, products, integration and differentiation to obtain other series <u>Students will grasp the following concepts:</u> ● Some functions may be continuous everywhere but not differentiable everywhere. ● A finite number of terms of an infinite series can be a general approximation of a function over a limited domain. ● Limits describe the output of a function as the input approaches a certain value and can represent convergence and divergence. ● Examining limits of functions at a point can help determine continuity and differentiability at a point.	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: Most lessons will start with direct instruction and introduction from the instructor. Students will work in small groups to solve problems and complete explorations – some will be consistent across groups, some will be unique allowing for each group/individual to have time to present their work. Discussions regarding method, alternate approaches, and efficiency will be regularly included in the class. ☐ Other/s:

	Formative assessment: Unit 1 Quizzes Textbook practice problems SL Review Question Sets from Question bank
	Summative assessment: Summative Assessments - Topic 5 pt. 1 Topic 5 pt. 2 Questions for the cumulative assessments come from released questions in the IB Question bank. Each summative assessment is cumulative by semester with the majority (60-75%) of the test coming from the content covered between summative assessments. Content will also include daily warmup topics from the time period between assessments (review of SL topics)
	Differentiation: ☐Affirm identity ☒Value prior knowledge ☐Scaffold learning ☒ Extend learning Details: The aim of the AHL content in the calculus topic is to extend and build upon the aims, concepts and skills from the SL content. Further powerful techniques and useful applications of differential and integral calculus are introduced.

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 mathematics

Self- Management - students will have problems sets to complete that will need to be balanced with their other time commitments and responsibilities.

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: Students will use the language of mathematics in connection to prior knowledge of calculus from IB AA SL. Students will learn new vocabulary, formats and notation related to Calculus and gain mastery of them through practice.	☒ Personal and shared knowledge ☒ Ways of knowing ☐ Areas of knowledge ☐ The knowledge framework Details: • Can a mathematical statement be true before it has been proven? • Does personal experience play a role in the formation of knowledge claims in mathematics? Does it play a different role in mathematics compared to other areas of knowledge? • Is there always a trade-off between accuracy and simplicity?	☐ Creativity ☐ Activity ☐ Service Details: N/A

Resources

List and attach (if applicable) any resources used in this unit

Textbook - Mathematics: Analysis and Approaches HL (Oxford – 2019) (Ch. 4, Ch. 7, Ch. 8)
IB QuestionBank
Revision Village Website videos and Question banks