

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

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| 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

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| <p>Transfer goals</p> <p><i>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.</i></p> |
| <p>Students should be able to:</p> <ul style="list-style-type: none"> • 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 |
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| <p><u>Students will know the following content:</u></p> <ul style="list-style-type: none"> ● 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. <p><u>Students will develop the following skills:</u></p> <ul style="list-style-type: none"> ● Use derivatives to analyze functions. ● Take derivatives to solve kinematics problems. <p><u>Students will grasp the following concepts:</u></p> <ul style="list-style-type: none"> ● Derivatives can be used to analyze situations – analytically, graphically, and in real world scenarios. | <p><i>Check the boxes for any pedagogical approaches used during the unit. Aim for a variety of approaches to help facilitate learning.</i></p> <p>Learning experiences and strategies/planning for self-supporting learning:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Lecture <input type="checkbox"/> Socratic seminar <input checked="" type="checkbox"/> Small group/pair work <input checked="" type="checkbox"/> PowerPoint lecture/notes <input checked="" type="checkbox"/> Individual presentations <input type="checkbox"/> Group presentations <input type="checkbox"/> Student lecture/leading <input type="checkbox"/> Interdisciplinary learning <p>Details:</p> <p>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.</p> <p>Teacher will provide multiple resources electronically and in person to support student learning.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Other/s: |

Formative assessment:

IB Questionbank Practice problems

TOTD – quick checks

HW quizzes: function analysis, kinematics

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| | <p>Summative assessment: Assessment #5 (5.7-5.8, 2.10-2.11, 3.1) Assessment #6 (5.8-5.9, 3.2-3.4)</p> <p>All assessments will use previous IB exam questions from the Questionbank Summative assessments include spiral review from year 1 content</p> |
| | <p>Differentiation:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Affirm identity—build self-esteem <input type="checkbox"/> Value prior knowledge <input checked="" type="checkbox"/> Scaffold learning <input checked="" type="checkbox"/> Extend learning <p>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.</p> |
| <p>Approaches to learning (ATL) <i>Check the boxes for any explicit approaches to learning connections made during the unit. For more information on ATL, please see the guide.</i></p> | |

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 <i>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.</i> | TOK connections <i>Check the boxes for any explicit TOK connections made during the unit</i> | CAS connections <i>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.</i> |
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| <input type="checkbox"/> Activating background knowledge <input type="checkbox"/> Scaffolding for new learning <input checked="" type="checkbox"/> Acquisition of new learning through practice <input checked="" type="checkbox"/> Demonstrating proficiency <p>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.</p> | <input type="checkbox"/> Personal and shared knowledge <input type="checkbox"/> Ways of knowing <input checked="" type="checkbox"/> Areas of knowledge <input type="checkbox"/> The knowledge framework <p>Details: Students will be applying what they learned in previous units to real world scenarios.</p> | <input type="checkbox"/> Creativity <input type="checkbox"/> Activity <input type="checkbox"/> Service <p>Details: N/A</p> |
| Resources <i>List and attach (if applicable) any resources used in this unit</i> | | |

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

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