DP Topic 5 - Unit 5 Applications of Integration Planner

Teacher(s)	Jessica Vaughn	**Subject group and course**	Mathematics – Analysis & Approaches		
Course part and topic	Unit 5 – Applications of Integration (Topic 5 – Calculus) Topic 5: AA SL 5.10-5.11 Review AA SL 4.5-4.12	**SL or HL/Year 1 or 2**	SL, Yr 2	**Dates**	Mid February – March
Unit description and texts		**DP assessment(s) for unit**			
Applications of Integration – Kinematics, Area between curves, Volume Oxford AA textbook: Chapter 10: From approximation to generalization: integration Chapter 13: Modeling change: more calculus Calculus, A Complete Course, by Mark Sparks		Assessment #10 (Kinematics, area between curves) Assessment #11 (Volume) All assessments will use previous IB exam questions from the Questionbank			

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:

- Represent and interpret real world data in graphical and numerical form (histograms, cumulative frequency curves, box and whisker plots)
- Conduct calculations and tests that determine relationships between variables.
- Determine the likelihood of events occurring and evaluate risks.

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> ● Kinematics – particle motion ● Area between two curves ● Volumes of solids by revolution <u>Students will develop the following skills:</u> ● How to calculate position, velocity, acceleration implementing differentiation and integration. ● How to find area between two curves using integration. ● How to find volume of figures formed by rotating functions around the x-axis. <u>Students will grasp the following concepts:</u> ● Position, velocity, and acceleration are rates of change (calculated by derivatives) the reverse is integration. ● Functions can be used to define regions, these regions can be defined by definite integrals. ● Definite integrals can be used to represent volume of three dimensional shapes formed by rotating a function around an axis.	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. Students have a background in kinematics from first semester. Now they will be able to work in reverse, using integration. Students will build on their knowledge of area under a function to calculate area between two functions and volumes by revolutions. Teacher will provide multiple resources electronically and in person to support student learning.

	Formative assessment: IB Questionbank Practice problems TOTD – quick checks HW quizzes: kinematics, area between curves, volume by revolutions
	Summative assessment: Assessment #10 (Kinematics, area between curves) Assessment #11 (Volume) All assessments will use previous IB exam questions from the Questionbank
	Differentiation: ☒Affirm identity—build self-esteem ☐Value prior knowledge ☒Scaffold learning ☒ Extend learning Details: Students have seen differentiation in the first semester. This unit will build on their background from differentiation. They will be given multiple opportunities to practice math skills within class problems and optional, extension resources from Khan Academy and Delta Math. Practice assignments will include solution guides so students can check their understanding.

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 statistics to display and summarize data easily

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: The applications of integration will be new to the students, but it builds on their previous course work in differentiation and integration. The vocabulary and notation will be demonstrated and learned through practice. The summative assessment will show students proficiency and can replace other grades based on mastery level shown. 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: Integration as an inverse operation of differentiation is an "undoing" process. Students solidify their knowledge of integration by applying in contextual situations.	☐ Creativity ☐ Activity ☐ Service Details: N/A

Resources *List and attach (if applicable) any resources used in this unit*
Textbook - Mathematics: Analysis & Approaches. Chapter 10 Calculus, A Complete Course by Mark Sparks IB QuestionBank Master Math Mentor Khan Academy Delta Math Master Math mentor, pdf notes and videos

flippedmath.com

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*