DP Unit 4 Integration Unit Planner

Teacher(s)	Jessica Vaughn	**Subject group and course**	Mathematics – Analysis & Approaches		
Course part and topic	Unit 4 – Integration (Topic 5: Calculus)	**SL or HL/Year 1 or 2**	SL, Yr 2	**Dates**	January- Mid February

Unit description and texts	**DP assessment(s) for unit**
Anti-differentiation (power rule, sine, cosine, e^x) and Integration (indefinite, definite), u-substitution Oxford AA textbook: Chapter 10: From approximation to generalization: integration Section 13.3: Integration with sine, cosine, and substitution Calculus, A Complete Course, by Mark Sparks, pages 487-515	Assessment #7 (anti-differentiation, indefinite integration) Assessment #8 (riemann sums, FTC) Assessment #9 (u-substitution) 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:

- Recognize the connection between differentiation and integration.
- Understand the concept of integration as finding an area

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> ● Methods of anti-differentiation: reverse power rule, sinx, cosx, e^x ● Concept of definite integration as an area ● Methods of approximating definite integrals with Riemann Sums ● The fundamental theorem of calculus to calculate a definite integral ● Properties of definite integrals ● U-substitution to integrate <u>Students will develop the following skills:</u> ● Use anti-differentiation as an inverse operation to find an indefinite integral ● Use approximation methods for definite integrals. ● Apply fundamental theorem of calculus to compute definite integrals <u>Students will grasp the following concepts:</u> ● Connect two parts of calculus: differentiation and integration. ● Describe graphical area as a definite integral and evaluate the area. ● U-substitution as an inverse of the chain rule of differentiation	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 differentiation from first semester – integration will build on what they learned previously. Teacher will provide multiple resources electronically and in person to support student learning. ☐ Other/s:

	Formative assessment: IB Questionbank Practice problems Calculus, A Complete Course practice assignments TOTD – quick checks HW quizzes: anti-differentiation, Riemann sums, fundamental theorem of calculus
	Summative assessment: Assessment #7 (anti-differentiation, indefinite integrals) Assessment #8 (fundamental theorem of calculus, definite integrals) Assessment #9 (u-substitution) 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 with in 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 integration to describe, define, and calculate area

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 topic of integration will be new to the students, but it builds on their knowledge of differentiation. 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. Fundamental theorem of calculus connects integration to differentiation and provides a method to calculate area.	☐ 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 Khan Academy Delta Math Master Math Mentor pdf notes files, and videos

flipped math.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*