DP AA HL Planner – Unit 2 - Topic 3 - Geometry and Trigonometry

Teacher(s)	Jessica Meade	**Subject group and course**	Mathematics – Analysis and Approaches		
Course part and topic	Unit 2 – Topic 3 – Geometry and Trigonometry AHL 3.9 - 3.18; SL Review 3.1 - 3.8	**SL or HL/Year 1 or 2**	HL, Yr 2	**Dates**	October/November
Unit description and texts		**DP assessment(s) for unit**			
Geometry and trigonometry allows us to quantify the physical world, enhancing our spatial awareness in two and three dimensions. This topic provides us with the tools for analysis, measurement and transformation of quantities, movements and relationships. It further explores the circular functions and introduces some important trigonometric identities. Vectors, and the operations performed upon them, allow us to model and calculate real life context including motion. Text – Oxford Mathematics Analysis and Approaches HL (6.1 - 6.4; Ch. 9)		Topic 3 Assessment pt. 1 (Trig) Topic 3 Assessment pt. 2 (Vectors) Questions for the cumulative assessments come from released questions in the IB Questionbank. Each summative assessment is cumulative 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 trigonometric functions and equations to model real world scenarios and solve problems involving points, lines and planes..
- Represent real world contexts using vectors and use these vectors to solve problems
- Recognize the use of vectors in the real world – such as technology, arts, and defense

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> ● Definition of reciprocal trig functions ● Pythagorean Identities ● Inverse Trig functions, their graphs and domain/range ● Compound angle identities, double angle identities for tangent ● Relationships between trig functions and the symmetry of their graphs ● Vectors – position, displacement, representation of, components of, zero, magnitude, direction, parallel, perpendicular, skew, intersecting ● Vector Equations – 2D, 3D, in a plane <u>Students will develop the following skills:</u> ● Graphing Inverse Trig Functions ● Using identities to solve problems and equations. ● Calculations with Vectors – sum, difference, scalar multiplication, scalar product (and properties), vector (cross) product (and properties) ● Find the angle between two lines, intersections with a plane (lines, planes) ● Applications of Vectors – kinematics, area of a parallelogram <u>Students will grasp the following concepts:</u> ● The relationships between algebraic, geometric and vector methods can help us to solve problems and quantify those positions and movements.Position and movement can be modeled in three-dimensional space using vectors. ● The relationships between algebraic, geometric and vector methods can help us to solve problems and quantify those positions and movements.	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 – 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:

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- Proof serves to validate mathematical formulae and the equivalence identities.

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Formative assessment:

SL Review of Topic 3 - SL 3.1 - 3.8
Quizzes

Textbook practice problems

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Summative assessment:
Topic 3 Assessment pt. 1 (Trig)
Topic 3 Assessment pt. 2 (Vectors)

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Differentiation:

☒Affirm identity—build self-esteem

☐Value prior knowledge

☒Scaffold learning

☒ Extend learning

Details:

This unit will build on student's prior knowledge of the unit circle and trigonometric functions and extend the content to include additional identities and inverse trig functions. Students will complete an SL Review Assignment (collection of released SL questions) based on the SL Trig standards. The many applications of vectors ground it in real life and provide connections for students. This will be students first exposure to vectors thus content will be scaffolded and/or extended to allow for student success.

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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/small group work Communication – utilizing the language and notation of vectors, sharing of ideas and strategies 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 trigonometry and solving equations. Students will learn new vocabulary, formats and notation related to trigonometric functions and identities and gain mastery of them through practice. The topic of Vectors will be new to the students. 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: ● What is the relationship between concepts and facts? To what extent do the concepts that we use shape the conclusions that we reach? ● Mathematics and knowledge claims: how can there be an infinite number of discrete solutions to an equation?	☒ Creativity ☐ Activity ☐ Service Details: Students can create a piece of art utilizing vectors and technology such as a Desmos; students could use vectors to map a 'most efficient' path and then walk/bike it.

Resources *List and attach (if applicable) any resources used in this unit*
Textbook - Mathematics: Analysis and Approaches HL (Oxford – 2019) – Sections 6.1 - 6.4, Ch. 9 IB QuestionBank Revision Village Website videos and Question banks

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