IB Physics YEAR 1 - Unit 3

Teacher(s)	IB Physics PLC	Subject Group and Course	Group 4 - Physics		
Course Part and Topic	Topic 6 - Circular Motion and Gravitation	SL or HL / Year 1 or 2	SL Year 1	Dates	January (3 weeks)
Unit Description and Texts		**DP Assessment(s) for Unit**			
Students will examine needed variables to allow an object to follow a circular path. ● Bowen-Jones, Michael, and David Homer. IB Physics. Oxford: Oxford UP, 2014. Print.		● 6.1 paper 1 quiz, 6.2 paper 1 quiz ● Test (paper 1 + paper 2)			

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.

Phenomenon: For a given car's velocity, a hill must have a specific minimum radius of curvature or it becomes a ramp.

Statement of Inquiry: Newton's first law states that motion is along a straight line at constant speed, however if there is a net external force the application of motion changes.

1. Students will calculate the needed conditions for an object to pass over a hill or around a loop.
2. Students will examine the needed conditions for orbital motion.

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> • ***Period, frequency, angular displacement and angular velocity*** • ***Centripetal force*** • ***Centripetal acceleration*** • ***Newton's law of gravitation*** • ***Gravitational field strength*** <u>Students will develop the following skills:</u> • **Identifying the forces providing the centripetal forces such as tension, friction, gravitational, electrical, or magnetic** • **Solving problems involving centripetal force, centripetal acceleration, period, frequency, angular displacement, linear speed and angular velocity** • **Qualitatively and quantitatively describing examples of circular motion including cases of vertical and horizontal circular motion** • **Describing the relationship between gravitational force and centripetal force** • **Applying Newton's law of gravitation to the motion of an object in circular orbit around a point mass** • **Solving problems involving gravitational force, gravitational field strength, orbital speed and orbital period** • **Determining the resultant gravitational field strength due to two bodies**	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: *Students will learn through a combination of presentations, small group work, practice problems, and lab work.* ☒ Other(s): *practice problems, lab work* **Formative assessment(s):** *Paper 1 quizzes at the end of each subtopic.*

<table>
<tr><td></td><td></td></tr>
<tr><td rowspan="2"></td><td>Summative assessments:

Topic test consisting of questions from P1, P2, and P3

partial lab report</td></tr>
<tr><td>Differentiation:

❑ Affirm identity - build self-esteem
✓ Value prior knowledge
✓ Scaffold learning
✓ Extend learning

Details:

● SWD/504 – Accommodations Provided
● ELL – Reading & Vocabulary Support
● Intervention Support
● Extensions – Enrichment Tasks and Project</td></tr>
<tr><td colspan="2">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.</td></tr>
<tr><td colspan="2">✓ Thinking
❑ Social
✓ Communication
✓ Self-management
❑ Research

Details:</td></tr>
</table>

Students will be continuously challenged to develop higher-order thinking skills as they take prior knowledge, combine it with new content, and analyze the data they collected to reach a conclusion.

Students will begin to prepare for the IA and group 4 project.

Students will communicate their findings to their peers in the form of small-group presentations.

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: *Concepts throughout topic 6 build into understanding final concepts and labs.* *Students will complete practice problems* *Students will produce a full scatter plot to determine emf and resistance of a cell with high and low gradients as demonstration of learning.*	❑ Personal and shared knowledge ✓ Ways of knowing ❑ Areas of knowledge ❑ The knowledge framework Details: Foucault's pendulum gives a simple observable proof of the rotation of the Earth, which is largely unobservable. How can we have knowledge of things that are unobservable?	❑ Creativity ❑ Activity ❑ Service Details:

Resources *List and attach (if applicable) any resources used in this unit*
● Textbooks (see page 1) ● Laboratory resources ● Online notes and videos (Schoology)

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*