

Marietta City Schools
2023–2024 District Unit Planner

Teacher(s)	Cole Phillips & Thomas Shamyla	Subject Group and Course	Group 4 - Physics		
Course Part and Topic	Topic A - Space, Time, and Motion	SL or HL / Year 1 or 2	SL Year 1	Dates	August- October (11 weeks)
Unit Description and Texts		DP Assessment(s) for Unit			
<ul style="list-style-type: none"> Bowen-Jones, Michael, and David Homer. IB Physics. Oxford: Oxford UP, 2014. Print. 		<ul style="list-style-type: none"> A.1 Quiz, A.2 Quiz, A.3 Quiz, Topic test 			

INQUIRY: establishing the purpose of the unit

Transfer Goals
<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><u>Phenomenon</u>: A plane can “fly blind” and arrive safely at the correct location by simply using vector coordinates.</p> <p><u>Statement of Inquiry</u>: Measurement is a process of detecting an unknown physical quantity by using a standard quantity.</p> <ol style="list-style-type: none"> Students will derive units for a quantity from SI units. Students will analyze data and propagate uncertainty to fit a scatter plot graph with high and low gradients. Students will add and subtract differing types of vectors to solve problems involving vector components.

ACTION: teaching and learning through inquiry

Content / Skills / Concepts - Essential Understandings	Learning Process
<p><u>Students will know the following content:</u></p> <ul style="list-style-type: none"> • <i>Fundamental and derived SI units</i> • <i>Scientific notation and metric multipliers</i> • <i>Significant figures</i> • <i>Orders of magnitude</i> • <i>Estimation</i> • <i>Random and systematic errors</i> • <i>Absolute, fractional and percentage uncertainties</i> • <i>Error bars</i> • <i>Uncertainty of gradient and intercepts</i> • <i>Solving vector problems graphically and algebraically</i> <p><u>Students will develop the following skills:</u></p> <ul style="list-style-type: none"> • Using SI units in the correct format for all required measurements, final answers to calculations and presentation of raw and processed data • Using scientific notation and metric multipliers • Quoting and comparing ratios, values and approximations to the nearest order of magnitude • Estimating quantities to an appropriate number of significant figures • Explaining how random and systematic errors can be identified and reduced • Collecting data that include absolute and/or fractional uncertainties and stating these as an uncertainty range (expressed as: best estimate \pm uncertainty range) • Propagating uncertainties through calculations involving addition, subtraction, multiplication, division and raising to a power • Determining the uncertainty in gradients and intercepts 	<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> <p><input checked="" type="checkbox"/> Lecture</p> <p><input type="checkbox"/> Socratic seminar</p> <p><input checked="" type="checkbox"/> Small group/pair work</p> <p><input checked="" type="checkbox"/> PowerPoint lecture/notes</p> <p><input checked="" type="checkbox"/> Individual presentations</p> <p><input type="checkbox"/> Group presentations</p> <p><input type="checkbox"/> Student lecture/leading</p> <p><input type="checkbox"/> Interdisciplinary learning</p> <p>Details:</p> <p><i>Students will learn through a combination of presentations, small group work, practice problems, and lab work.</i></p> <p><input checked="" type="checkbox"/> Other(s): <i>practice problems, lab work</i></p>

<ul style="list-style-type: none"> • Resolution of vectors will be limited to two perpendicular directions • Problems will be limited to addition/subtraction of vectors and multiplication/division of vectors by scalars 	<p>Formative assessment(s):</p> <p><i>Paper 1 quizzes at the end of each subtopic.</i></p>
	<p>Summative assessments:</p> <p><i>Topic test consisting of questions from P1 and P3</i></p>
	<p>Differentiation:</p> <ul style="list-style-type: none"> ✓ Affirm identity - build self-esteem ☐ Value prior knowledge ✓ Scaffold learning ✓ Extend learning <p>Details:</p> <ul style="list-style-type: none"> • SWD/504 – Accommodations Provided • ELL – Reading & Vocabulary Support • Intervention Support • Extensions – Enrichment Tasks and Project
<p>Approaches to Learning (ATL)</p> <p><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>	
<ul style="list-style-type: none"> ✓ Thinking ☐ Social 	

- ✓ Communication
- ☐ Self-management
- ☐ Research

Details:

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

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>
<ul style="list-style-type: none"> ✓ Activating background knowledge <input type="checkbox"/> Scaffolding for new learning ✓ Acquisition of new learning through practice ✓ Demonstrating proficiency <p>Details:</p> <p><i>Students will collect data using a concept learned in MYP Physics (free fall) for students to then analyze. Students will discuss their margin of error from calculations.</i></p>	<ul style="list-style-type: none"> <input type="checkbox"/> Personal and shared knowledge ✓ Ways of knowing <input type="checkbox"/> Areas of knowledge <input type="checkbox"/> The knowledge framework <p>Details:</p> <p><i>What has influenced the common language used in science? To what extent does having a common standard approach to measurement facilitate the sharing of knowledge in physics?</i></p>	<ul style="list-style-type: none"> <input type="checkbox"/> Creativity ✓ Activity <input type="checkbox"/> Service <p>Details:</p> <p><i>Students will actively be carrying out experiments involving dropping objects and free fall.</i></p>

<p><i>Students will complete practice problems</i></p> <p><i>Students will produce a full scatter plot with high and low gradients as demonstration of learning.</i></p>		
<p>Resources</p> <p><i>List and attach (if applicable) any resources used in this unit</i></p>		
<ul style="list-style-type: none"> • Textbooks (see page 1) • Laboratory resources • Online notes and videos (Schoology) 		

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>