Marietta City Schools

2025–2026 District Unit Planner

Grade & Course: Honors Physics	**Topic:** 1D Motion	**Duration:** 6 weeks
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Georgia Standards and Content:

SP1. Obtain, evaluate, and communicate information about the relationship between distance, displacement, speed, velocity, and acceleration as functions of time.

a. Plan and carry out an investigation of one-dimensional motion to calculate average and instantaneous speed and velocity.

- Analyze one-dimensional problems involving changes of direction, using algebraic signs to represent vector direction.
- Apply one-dimensional kinematic equations to situations with no acceleration, and positive, or negative constant acceleration.

b. Analyze and interpret data using created or obtained motion graphs to illustrate the relationships among position, velocity, and acceleration, as functions of time.

c. Ask questions to compare and contrast scalar and vector quantities.

Narrative / Background Information

Prior Student Knowledge: (REFLECTION – PRIOR TO TEACHING THE UNIT)

From 8th grade Physical Science

- Basic algebra
- Basic understanding of distance, speed, and acceleration
- Basic calculations involving constant speed

Year-Long Anchoring Phenomena: (LEARNING PROCESS)

The laws of physics dictate the interactions of our physical world.

Unit Phenomena (LEARNING PROCESS)

All motion is composed of just a few components acting together creating a variety of different motion.

MYP Inquiry Statement:

Modeling changes in motion graphically and mathematically predicts future movement.

MYP Global Context:

Scientific and Technical Innovation

Approaches to Learning Skills:	**Disciplinary Core Ideas: (KNOWLEDGE & SKILLS)**	**Crosscutting Concepts: (KNOWLEDGE & SKILLS)**
Research Skills Thinking Skills Collaboration Skills Communication Skills	Kinematics Scalars Vectors Displacement Vector Diagrams	Cause & Effect (CC) Stability & Change (CC & MYP) Systems & System Models (CC & MYP) Patterns (CC)
		MYP Key and Related Concepts: **Select one Key Concept:** Cause & Effect (CC) Stability & Change (CC & MYP) Systems & System Models (CC) Patterns (CC) Movement & Energy **Select one or more RC:**

Possible Preconceptions/Misconceptions: (REFLECTION – PRIOR TO TEACHING THE UNIT)

- Difference between scalar and vector forms of measurements (distance vs displacement, speed vs velocity)
- The constant/average velocity equation cannot be used to solve for an instantaneous velocity to substitute into a kinematic equation (involving acceleration).
- Meaning of slope of different motion graphs and how to find it. Many students simply divide the final x,y coordinate instead of calculating the slope.
- Deceleration should be thought of as a negative acceleration if the initial direction of motion is declared positive. This has large consequences for solving kinematic equations.

Key Vocabulary: (KNOWLEDGE & SKILLS)

- Distance vs Displacement
- Speed vs Velocity
- Acceleration
- Gravity
- Vector vs Scalar

Inquiry Questions:

Factual

- What is the difference between constant velocity, average velocity, and instantaneous velocity?
- What do the slope and area under displacement-time, velocity-time, and acceleration-time graphs mean?
- What is the acceleration of gravity?

Conceptual

- When do directions (+, -) need to be assigned?
- How can the fall time of an object be determined?
- How can the stopping distance of a car be determined?

Debatable

- Who would win a race between a person and a car?

MYP Objectives	**Summative assessment**	
MYP A: ● ii- apply scientific knowledge and understanding to solve problems set in familiar and unfamiliar situations ● iii- analyse and evaluate information to make scientifically supported judgments.	Assessment Task: 1D Summative Test:	Relationship between summative assessment task(s) and statement of inquiry: The assessment measures how well students determine vector quantities using graphical and mathematical analysis.
Unit Objectives: 1D Motion Need to Know -		
Learning Activities and Experiences	**Inquiry & Obtain: (LEARNING PROCESS)**	**Evaluate: (LEARNING PROCESS)**	**Communicate: (LEARNING PROCESS)**

Week 1/2:	Students observe the motion of cars to determine what factors are needed to determine travel time and what motions they need to account for.	Students use constant velocity equations and acceleration equations to determine the amount of time it will take for a car to travel on the road.	Students create whiteboards showing their work to determine the time it takes a car to travel a specific distance. They compare against actual time to determine if the car is better modeled as accelerating or with constant velocity.
Week 2/3:	Students create motion graphs of them moving (constant velocity vs acceleration) to determine how position and velocity are represented graphically.	Students evaluate motion graphs comparing object(s) accelerating and moving at constant velocity to predict who will move a given displacement in a shorter time.	Students create whiteboards showing their work to determine the winner of a race (constant velocity vs acceleration)
Week 3/4:	Students observe different objects in free fall and discuss what factors impact fall time.	Students use the displacement kinematic equation to predict fall time of an object released from a known height and compare it to actual fall time.	Students create whiteboards showing their work to determine the time it takes an object to fall with mathematical processes on one side and step by step word explanations on the other
Week 4/5:	Students observe carts stopping on different surfaces and discuss what factors affect stopping distance.	Students use the velocity kinematic equation to predict the stopping distance of a cart and compare it to the actual stopping distance.	Students create whiteboards showing their work to determine the stopping distance of an object with mathematical processes on one side and step by step word explanations on the other

Week 5/6: Remediation	Students complete a review quiz to diagnose strengths and weaknesses in the content.	Students complete review activities based upon quiz results.	

Resources (hyperlink to model lessons and/or resources): (click here for description)

- Discovery Education Science Techbook - Introduction to Force and Motion Unit
- 1D Motion Schoology Unit:

Reflection: Considering the planning, process and impact of the inquiry

Prior to teaching the unit	During teaching	After teaching the unit
• Difference between scalar and vector forms of measurements (distance vs displacement, speed vs velocity) • The constant/average velocity equation cannot be used to solve for an instantaneous velocity to substitute into a kinematic equation (involving acceleration). • Meaning of slope of different motion graphs and how to find it. Many students simply divide the final x,y coordinate instead of calculating the slope. • Deceleration should be thought of as a negative acceleration if the initial direction of motion is declared positive. This has large consequences for solving kinematic equations.	• Data suggest adequate student progress per CFAs.	(click here)