



COVERNMENT PROPERTY E

Lesson Exemplar for Science



IMPLEMENTATION OF THE MATATAG K TO 10 CURRICULUM

Lesson Exemplar for Science Grade 8 Quarter 4: Lesson 2 of 8 (Week 2) SY 2025-2026

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Development Team
Writer:AI B. Besmonte (Bicol University)
Reviewed and Revised: • Jessa V. Logronio (Silliman University)
Management Team Philippine Normal University Research Institute for Teacher Quality SiMERR National Research Centre

Every care has been taken to ensure the accuracy of the information provided in this material. For inquiries or feedback, please write or call the Office of the Director of the Bureau of Learning Resources via telephone numbers (02) 8634-1072 and 8631-6922 or by email at blr.od@deped.gov.ph.

SCIENCE (PHYSICS)/QUARTER 4/GRADE 8

I. CURRICULUM CON	ITENT, STANDARDS, AND LESSON COMPETENCIES
A. Content Standards	 Forces cause objects to accelerate. An object is accelerating if the magnitude and/or direction of its velocity changes. Kinetic energy is the energy of movement, and potential energy is stored energy. As an object falls from a height its energy is conserved because its potential energy is transformed to kinetic energy. The resources of the Philippines provide many benefits to its people and their activities.
B. Performance Standards	By the end of the Quarter, learners demonstrate understanding of the technical meaning of acceleration and apply their understanding to everyday situations involving motion. They represent and interpret acceleration in distance- time and velocity-time graphs to make predictions about the movement of objects. Learners link motion to kinetic energy and potential energy and explain transformations between them using everyday examples. Learners relate understanding of kinetic energy and potential energy to an appreciation of the hydro-electric resources of the Philippines for the generation of electricity for use in homes, communities, and industries. They use scientific investigations to explore the properties of light and apply their learning to solving problems in everyday situations.
C. Learning Competencies and Objectives	Learning Competency: The learners construct and annotate distance-time graphs and velocity-time graphs to represent uniform and non-uniform acceleration. Lesson Objective 1: construct distance-time graphs using given data of motion with uniform and non-uniform acceleration. Lesson Objective 2: label axes with appropriate units (e.g., time in seconds, distance in meters) and add titles of distance- time graphs. Lesson Objective 3: describe the distance-time graphs of motion with uniform and non-uniform acceleration. Lesson Objective 4: construct velocity-time graphs using given data of motion with uniform and non-uniform acceleration. Lesson Objective 5: label axes with appropriate units and add titles of velocity-time graphs. Lesson Objective 6: describe the velocity-time graphs of motion with uniform and non-uniform acceleration.
D. Content	Motion Graphs Displacement-time graph A displacement-time graph shows the displacement a moving object has traveled against time, where the slope is equal to the velocity of the object. Displacement is plotted on the Y-axis (the vertical line), while time is plotted on the X-axis (the horizontal line) on the Cartesian plane.

	In uniform acceleration, the graphs can be a horizontal line, which indicates a stationary object, an upward slope signifies motion in a positive direction, and a downward slope signifies motion in a negative direction. The steeper the graph, the greater the velocity. In non-uniform acceleration, the nature of the displacement-time graphs can be a curve line, a zig-zag line, or a combination. Velocity-time graph A velocity-time graph displays how an object's speed changes over time. Velocity is plotted on the Y-axis (the vertical line), while time is plotted on the X-axis (the horizontal line) on the Cartesian plane. In uniform acceleration, a horizontal line indicates constant speed, an upward slope denotes acceleration, and a downward slope represents decleration. The slope of a velocity-time graph reflects acceleration, where a steeper slope indicates higher acceleration and a flat line signifies no acceleration. In non-uniform acceleration, the graphs are not a straight line as the velocity varies in time. They may be in a curve line, zigzag line, or combination.
E. Integration	Values Integration: Resilience To face life's ups and downs, we need to cultivate the virtue of resilience, which is the capacity to recover quickly from difficulties and adapt to change, just as an object in motion might encounter various speeds and changes in direction.

II. LEARNING RESOURCES

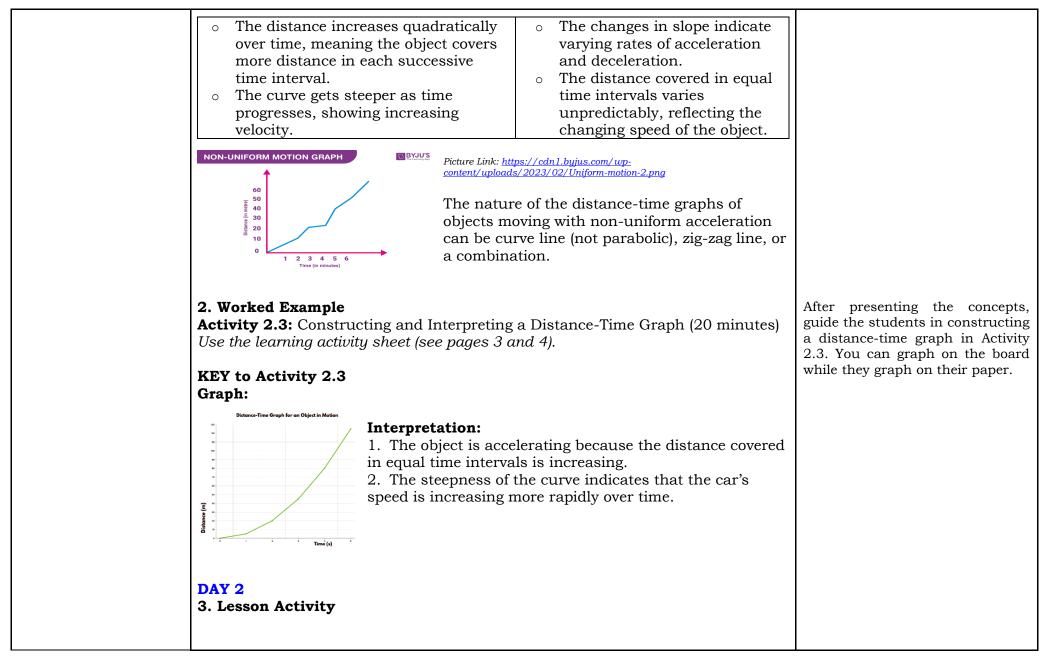
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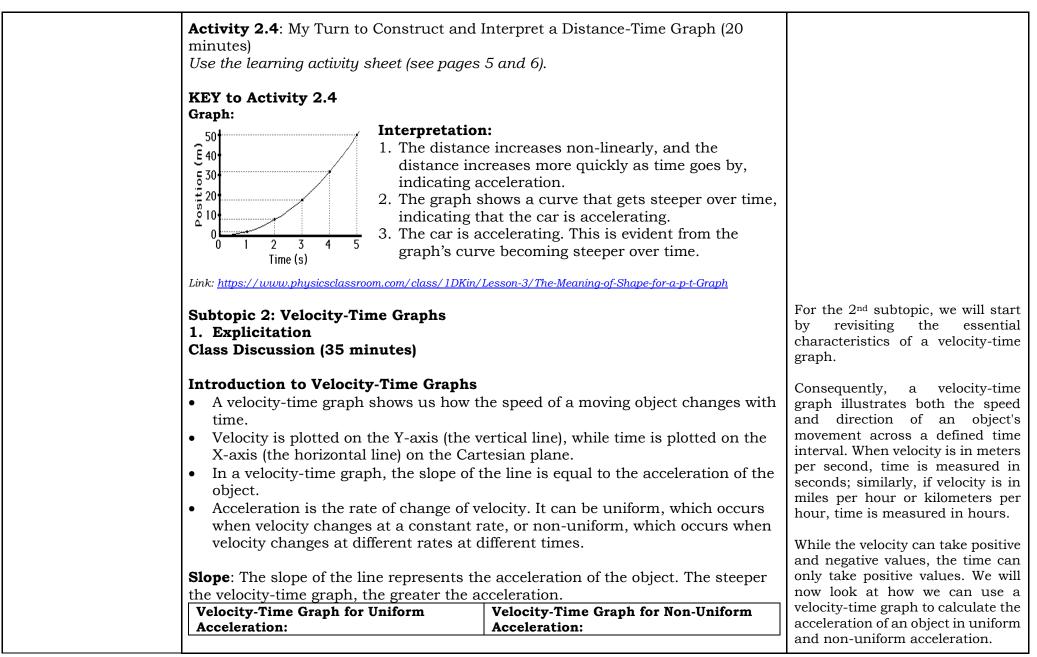
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III. TEACHING AND LE	ARNING PROCEDURE	NOTES TO TEACHERS
A. Activating Prior Knowledge	DAY 1 Activity 2.1. Deal or No Deal (5 minutes) Use the learning activity sheet (see page 1). KEY to Activity 2.1 1. Deal 2. No Deal 3. Deal 4. Deal 5. No Deal	Start the class by reviewing the distance-time graph learned in Grade 7 and the concept of acceleration from last week's lesson. Use the game "Deal or No Deal" to assess prior knowledge. If possible, project the items or statements on your TV and have everyone decide if it's a deal or no deal. Ask students to raise their hand or stand if they choose "Deal." The concepts in this review are the prerequisites of this lesson on graphical analysis of motion, specifically constructing and interpreting distance-time graphs and velocity-time graphs.
B. Establishing Lesson Purpose	 Lesson Purpose (5 minutes) How did we describe motion in Grade 7 and last week's lesson? In Grade 7 Science, you have learned to describe motion using the concepts of distance, displacement, speed, and velocity. The previous lesson described motion using the concept of acceleration and its formula. How Else and Why? How else can we describe motion? And why? 	Establish the lesson purpose by asking your students "How else can we describe motion? And why?" Discuss how graphs help visualize and analyze motion, making

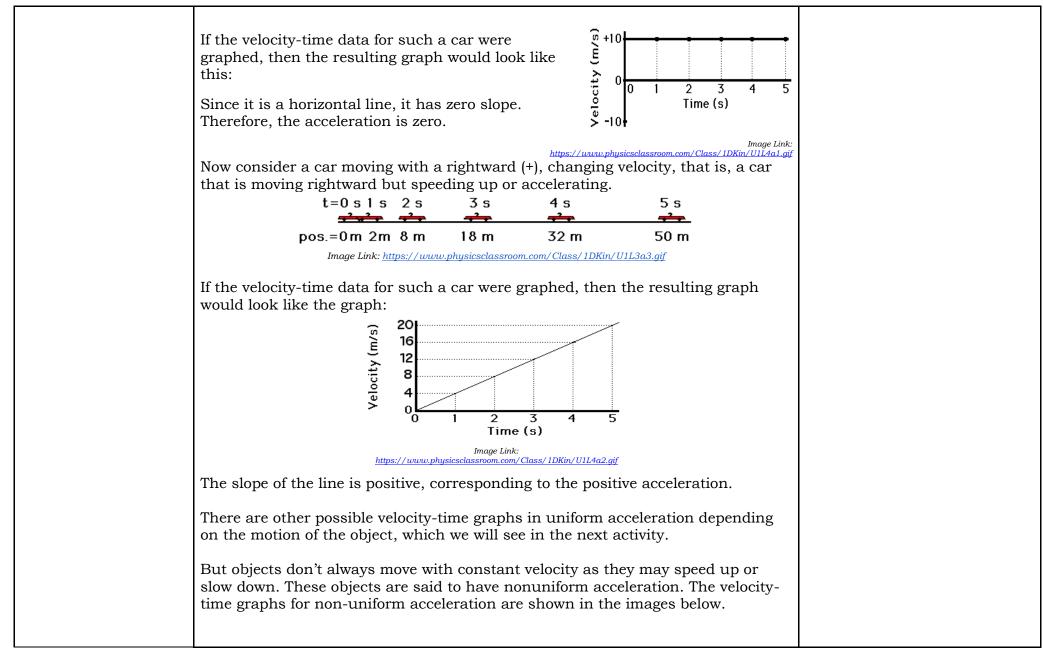
	 When trying to explain how things move, physicists don't just use equations – they also use graphs! Motion graphs allow to describe and analyze an object's motion through visual representations. In this lesson, you will know more about uniform and non-uniform acceleration using displacement-time graphs and velocity-time graphs. 2. Unlocking Content Vocabulary Activity 2.2. Matching Type (5 minutes) Use the learning activity sheet (see page 2).	complex data easier to understand. Unlock important terms that will be used in this lesson using the crossword puzzle. KEY to Activity 2.2 1. a 2. d 3. b 4. c
C. Developing and Deepening Understanding	Graphical Analysis of Motion Subtopic 1: Distance-Time Graph 1. Explicitation Class Discussion (20 minutes) A distance-time graph shows the distance traveled by a moving object over time. It is also known as a position-time graph.Axes and Labels: X-Axis (Horizontal line): Represents time, usually measured in seconds (s), minutes (min), or hours (h). Y-Axis (Vertical line): Represents distance, usually measured in meters (m), kilometers (km), or miles. Each point on the distance-time graph corresponds to a specific time and the distance traveled by the object at that time. Slope: The slope of the line represents the speed of the object. A steeper slope indicates a higher speed.Interpreting Distance-Time GraphsSample GraphGraphInterpretationExampleSample GraphSample Graph	 For the 1st subtopic, start by revisiting the essential characteristics of a distance-time graph. Distance is measured in meters, kilometers, or miles, while time is measured in seconds or hours. In Grade 7, students have learned about distance-time graphs of uniform motion or motion with constant velocity. This year, they will focus on distance-time graphs of motion with uniform and non-uniform acceleration. In discussing the meaning of distance-time graphs, present again the shapes covered in Grade 7 (the horizontal and diagonal distance-time graphs) to easily connect the lesson in Grade 8. The form or shape of distance-time graphs is defined by the kind of motion they represent. It will

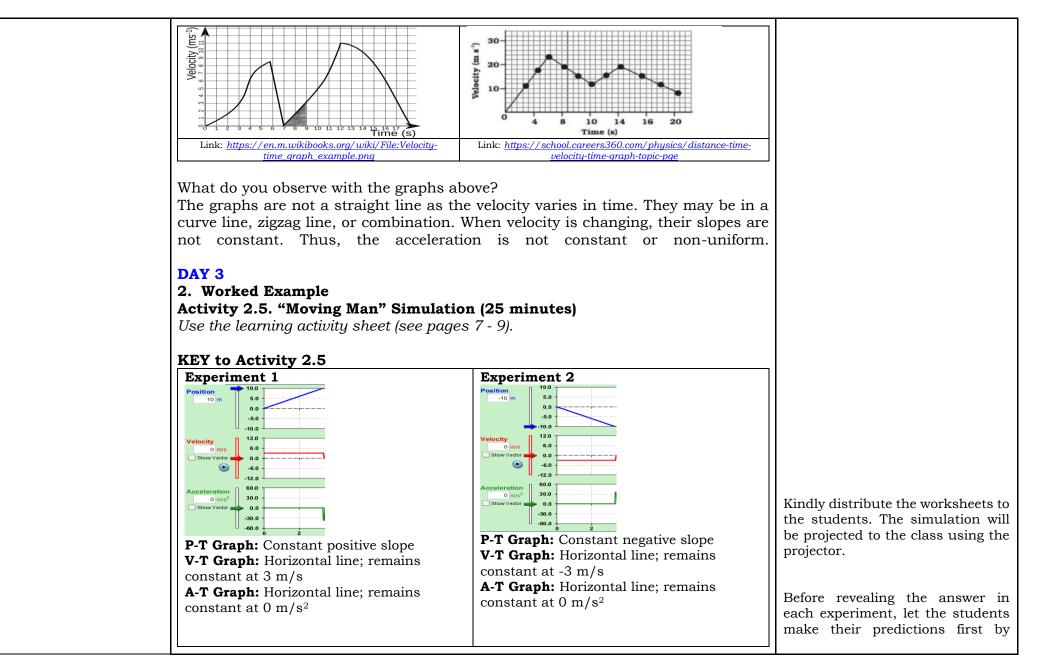
1. Straight Diagonal Line Going Up	Uniform Motion (Forward direction)	An object travels 10 meters every second forward, indicating a constant speed of 10 m/s.	upitised time	appear as a straight diagonal line going up if the object is moving at a constant speed since there is an equal amount of distance in equal time intervals. Its steepness will vary. The steeper the line graph means the faster the speed.
2. Straight Diagonal Line Going Down	Uniform Motion (Backward direction)	An object travels 10 meters every second backward, indicating a constant speed of 10 m/s.	bosition	On the other hand, if the slope of the line is zero it means that the object's position does not change. Thus, it represents no motion. For motion with uniform
3. Horizontal Line	No Motion : The distance remains constant over time.	An object is stationary.	uojisod time	acceleration, the distance-time graph will be a parabolic curve in shape. This is due to the speed increasing at a constant rate. Hence, the distance covered is changing rapidly.
4. Curved (Parabolic)	Uniform Acceleration : The object's speed is changing at a constant rate over time.	An object moves at a constant acceleration of 1 m/s ² .	(m) unitian (m) Time (s)	changing rapidly.
Distance-Time Acceleration	e Graph for Uniform	Distance-Time Uniform Accele	-	
 Appearance: The graph is a curved line. The curve is a parabola opening upwards if acceleration is positive, indicating that the object is speeding up. If the acceleration is negative, the curve would open downwards, 		irregular cu	s a non-linear, urve that may ection or curvature.	
 upwards if indicating up. o If the acce curve wou 	that the object is speeding leration is negative, the	g o It does not : predictable	form a smooth, parabola.	

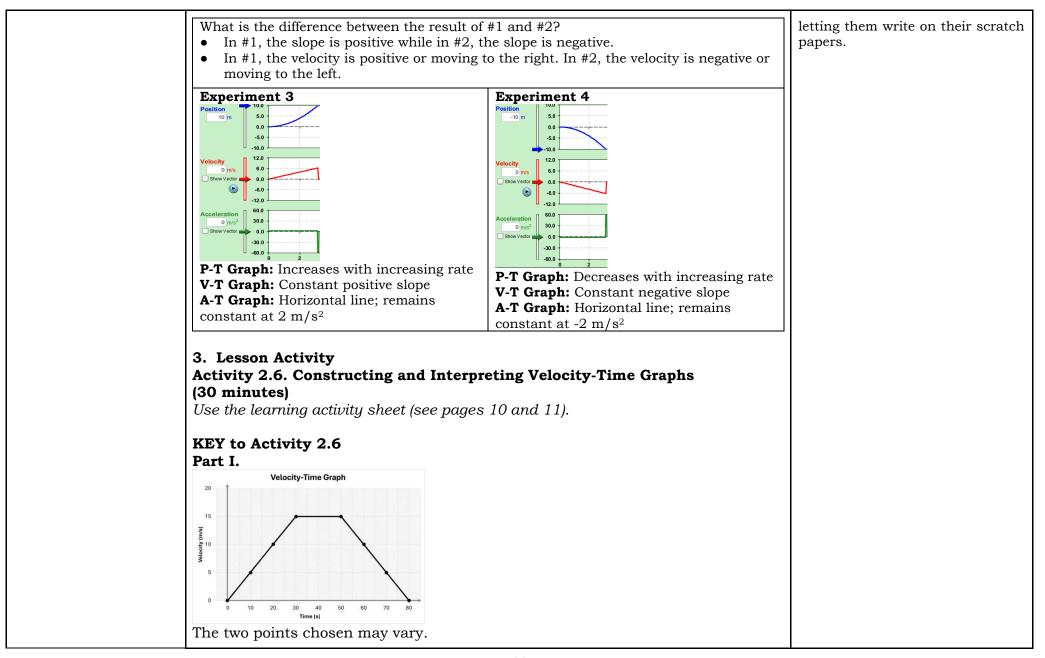




 The graph is a straight, sloped line. If acceleration is positive, the line slopes upwards. If acceleration is negative (deceleration), the line slopes downwards. 	elocity (v) data. axis (time) and y-axis (v xes. air on the graph. ath a line or curve.	aph changes, acceleration. es non-linearly object speeding wn at varying	ent the illustrations jector or through an ted material).
 The slope of the line represents the constant rate of acceleration. The velocity increases (or decreases) linearly over time, showing a steady change in speed. How to Construct a Velocity-Time Graph 1. Collect Data: Gather time (t) and ver 2. Set Up Axes: Draw and label the x-3. Choose Scale: Set scales for both a 4. Plot Data Points: Plot each (t, v) pa 5. Connect Points: Connect points wi 6. Label Graph: Title the graph and la 	 The slope of the grap reflecting varying ac The velocity changes over time, with the cup and slowing down rates. h: elocity (v) data. axis (time) and y-axis (variante) and y-axis (variante). air on the graph. th a line or curve. 	acceleration. les non-linearly e object speeding wn at varying	
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 Collect Data: Gather time (t) and version of the second sec	elocity (v) data. axis (time) and y-axis (v xes. air on the graph. ath a line or curve.	(velocity).	
elocity-time Graph of Uniform or Cons	be for motion insights.		
Let us start with velocity-time graphs of ar	n object moving in unifo	form velocity.	
Consider a car moving with a constant, rig	shtward (+) velocity of +1	+10 m/s.	
t=0s 1s 2s	3s 4s 5	,	
pos.=0 m 10 m 20 m		5 s	
		,	



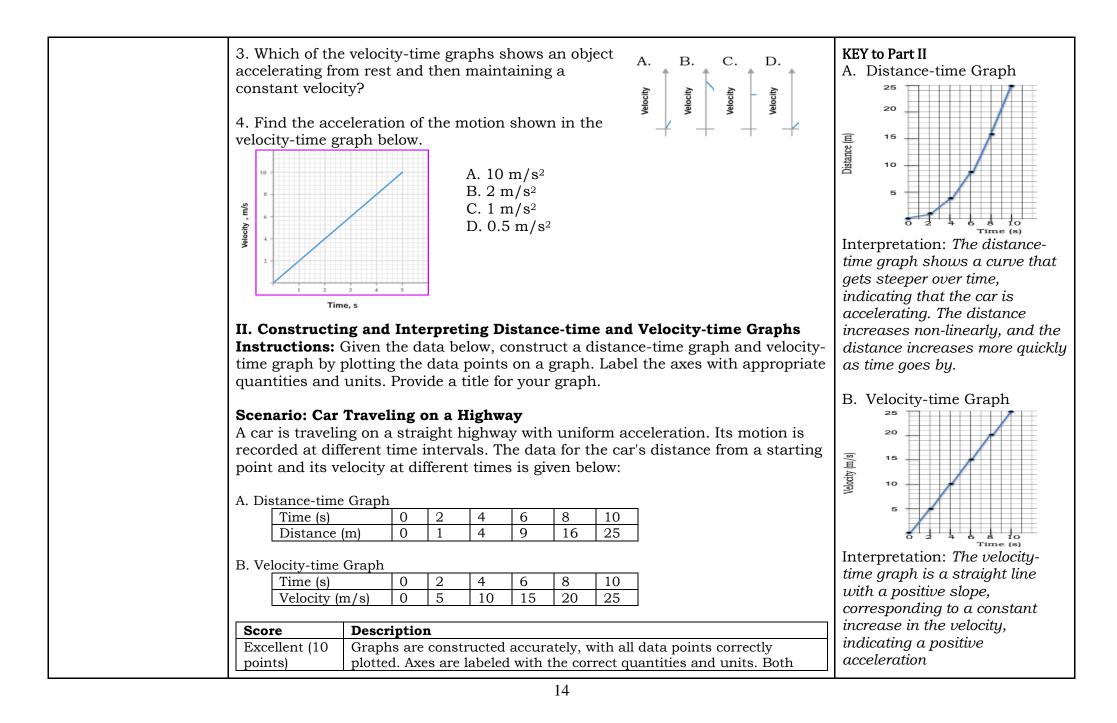




	$slope = \frac{y_2 - y_1}{x_2 - x_1} = \frac{15\frac{m}{s} - 10\frac{m}{s}}{30s - 20s}$ $= \frac{5\frac{m}{s}}{10s} = 0.5 \ m/s^2$	
	You may also let the students solve the slopes of each line segment.	
	Part II. 1. <u>BC</u> is steeper than <u>AB</u> . Thus, <u>BC</u> has a greater acceleration than <u>AB</u> . 2. <u>AB</u> : $a = \frac{4\frac{m}{s} - 0\frac{m}{s}}{2s - 0s} = \frac{4\frac{m}{s}}{2s} = 2m/s^2$	
	<u>BC</u> : $a = \frac{12\frac{m}{s} - 4\frac{m}{s}}{4s - 2s} = \frac{8\frac{m}{s}}{2s} = 4m/s^2$	
	Based on the calculated accelerations, my answer agrees with #2 that \underline{BC} has a greater acceleration than \underline{AB} .	
	3. The velocity is constant, and the acceleration is zero. 4. The velocity decreases until it becomes zero. <u>DE</u> : $a = \frac{0\frac{m}{s} - 12\frac{m}{s}}{\frac{7s - 6s}{s}} = \frac{-12\frac{m}{s}}{\frac{1s}{s}}$	
	The acceleration is negative.	
D. Making Generalization s	 DAY 4 1. Learners' Takeaways Activity 2.7. Brain Dump! Use the learning activity sheet (see page 12). KEY to Activity 2.7 1. To construct distance-time and velocity-time graphs, draw and label the x-axis (time) and y-axis (displacement), set appropriate scales for both axes, plot each 	Reflection on Learning Answer Guide : To face life's ups and downs, we need to cultivate the virtue of resilience, which is the capacity to recover quickly from difficulties and adapt to change, just as an object in
	(unic) and y axis (displacement), set appropriate scales for both axes, plot cach	motion might encounter various speeds and changes in direction.

 point on the graph, connect points with a line or curve, title the graph and label axes with units, and analyze the graph's shape for motion insights. 2. The distance-time graph is a curve line (parabola) for uniform acceleration; for non-uniform acceleration, it is an irregular, non-linear curve. 3. For uniform acceleration, the velocity-time graph is a straight, sloped line; for non-uniform acceleration, it is a curved or segmented line with varying slopes.
 2. Reflection on Learning One-Minute Paper Life is often compared to a journey where we face various speeds and changes in direction, just like the objects we study in physics. What virtue do we need to develop to face life's ups and downs?

IV. EVALUATING LEAP	RNING: FORMATIVE ASSESSMENT AND TEACHER'S REFLECTION	NOTES TO TEACHERS
A. Evaluating Learning	1. Formative Assessment	Answer Key
Learning	 I. Multiple Choice. Read and understand each item below. Choose the correct answer from the given choices below each item. 1. In a distance-time graph, what variable should be plotted on the y-axis and x-axis? A. Y-axis: Time; X-axis: Distance B. X-axis: Time; Y-axis: Distance C. X-axis: Time; Y-axis: Velocity 2. When looking at a velocity-time graph, what variable should be plotted on the y-axis and x-axis? A. Y-axis: Time; X-axis: Distance C. X-axis: Time; X-axis: Velocity 2. When looking at a velocity-time graph, what variable should be plotted on the y-axis and x-axis? A. Y-axis: Time; X-axis: Distance C. X-axis: Time; Y-axis: Velocity B. X-axis: Time; Y-axis: Distance D. Y-axis: Time; X-axis: Velocity 	1. B 2. C 3. A 4. B



	Satisfactory (8 points) Developing (6 points) Beginning (4 points)	complete Graphs a Axes are Titles are interpret Graphs I incorrect vague or Graphs a are not I Titles are	have clear, descriptive titles. Accure answers to the question are give are mostly accurate, with minor of labeled correctly, but there may e present and descriptive but cou- cation with minor inaccuracies. have several errors in plotting da tly, or units may be missing/inac- incorrect. Basic interpretation p are inaccurate with many errors abeled or are labeled incorrectly e missing or completely incorrect t answers are given.	en. errors in plotting data points. be minor issues with units. ild be more precise. Good ta points. Axes may be labeled ecurate. Titles are present but artially answers the question. in plotting data points. Axes without appropriate units.			
	No Attempt to Answer (0 points)	No answ].		
B. Teacher's Remarks	Note observation of the following c		Effective Practices	Problems Encountered	The teacher may note some observations related to the effective practices and problems		
	strategies expl	ored			encountered after utilizing the		
	materials used				different strategies, materials used, learner engagement, and		
	learner engage interaction	ment/			other aspects. They may also suggest ways to improve the different activities explored/ lesson exemplars.		
	others						
C. Teacher's Reflection	What prin Why did students What role What did ways for What cou	<u>s behind t</u> nciples and I teach the es did my s my stude	Teachers' reflection in every lesson conducted/ facilitated is essential and necessary for improving practice. You may also consider this as input for the LAC sessions.				