

Instructor: Mike Maksimchuk	Course/Grade Level: Physics A	Week: 1
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Unit 1: Intro & Energy Transfer	Evidence of Learning/Assessments: Weekly Socratic Quiz, Unit Test
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Standards (Learning Targets)	" I can ---- "	Instructional Strategies
P4.3A - Identify the form of energy in given situations (e.g., moving objects, stretched springs, rocks on cliffs, energy in food). (i.e., give examples of KE, gPE, CPE, EPE.)	...identify different forms of energy in the world around me	Guided Notes Practice Problems Golf Ball Lab
P4.1A - Account for and represent energy into and out of systems using energy transfer diagrams.	...create an energy transfer diagram	Energy Transfer Diagrams
P4.3C - Explain why all mechanical systems require an external energy source to maintain their motion.	...explain why perpetual motion is not possible.	Class discussion
P4.2f - Identify and label the energy inputs, transformations, and outputs, using qualitative or quantitative representations, in simple technological systems (e.g., toaster, motor, hair dryer) to show energy conservation. (application)	... use the conservation of energy to create an energy transfer diagram	Energy Transfer Diagrams
P4.2A - Account for and represent energy transfer and transformation in complex processes (interactions).	...account for all energy in a given system	Energy Transfer Diagrams

Key Vocabulary

Kinetic Energy	Thermal Energy	Transfer			
Potential Energy	Gravitational Energy	Efficiency			
Elastic Energy	Height				
Mechanical Energy	Mass				
Chemical Energy	Joules				
Nuclear Energy	Energy				

Instructor: Mike Maksimchuk	Course/Grade Level: Physics A	Week: 1
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Unit 1: Energy Transfer	Evidence of Learning/Assessments: Weekly Socratic Quiz, Unit Test
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Standards (Learning Targets)	" I can ---- "	Instructional Strategies
P4.3A - Identify the form of energy in given situations (e.g., moving objects, stretched springs, rocks on cliffs, energy in food). (i.e., give examples of KE, gPE, CPE, EPE.)	...identify different forms of energy in the world around me	Guided Notes Practice Problems Golf Ball Lab
P4.1A - Account for and represent energy into and out of systems using energy transfer diagrams.	...create an energy transfer diagram	Energy Transfer Diagrams
P4.3C - Explain why all mechanical systems require an external energy source to maintain their motion.	...explain why perpetual motion is not possible.	Class discussion
P4.2f - Identify and label the energy inputs, transformations, and outputs, using qualitative or quantitative representations, in simple technological systems (e.g., toaster, motor, hair dryer) to show energy conservation. (application)	... use the conservation of energy to create an energy transfer diagram	Energy Transfer Diagrams
P4.2A - Account for and represent energy transfer and transformation in complex processes (interactions).	...account for all energy in a given system	Energy Transfer Diagrams

Key Vocabulary

Kinetic Energy	Thermal Energy	Transfer			
Potential Energy	Gravitational Energy	Efficiency			
Elastic Energy	Height				
Mechanical Energy	Mass				
Chemical Energy	Joules				
Nuclear Energy	Energy				

Instructor: Mike Maksimchuk	Course/Grade Level: Physics A	Week: 3
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Unit 1: Energy Transfer	Evidence of Learning/Assessments: Weekly Socratic Quiz, Unit Test
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Standards (Learning Targets)	" I can ---- "	Instructional Strategies
P4.3A - Identify the form of energy in given situations (e.g., moving objects, stretched springs, rocks on cliffs, energy in food). (i.e., give examples of KE, gPE, CPE, EPE.)	...identify different forms of energy in the world around me	Guided Notes Practice Problems Golf Ball Lab
P4.1A - Account for and represent energy into and out of systems using energy transfer diagrams.	...create an energy transfer diagram	Energy Transfer Diagrams
P4.3C - Explain why all mechanical systems require an external energy source to maintain their motion.	...explain why perpetual motion is not possible.	Class discussion
P4.2f - Identify and label the energy inputs, transformations, and outputs, using qualitative or quantitative representations, in simple technological systems (e.g., toaster, motor, hair dryer) to show energy conservation. (application)	... use the conservation of energy to create an energy transfer diagram	Energy Transfer Diagrams
P4.2A - Account for and represent energy transfer and transformation in complex processes (interactions).	...account for all energy in a given system	Energy Transfer Diagrams

Key Vocabulary

Kinetic Energy	Thermal Energy	Transfer			
Potential Energy	Gravitational Energy	Efficiency			
Elastic Energy	Height				
Mechanical Energy	Mass				
Chemical Energy	Joules				
Nuclear Energy	Energy				

Instructor: Mike Maksimchuk	Course/Grade Level: Physics A	Week: 4
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Unit 2: Motion	Evidence of Learning/Assessments: Weekly Socrative Quiz, Unit Test
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Standards (Learning Targets)	" I can ---- "	Instructional Strategies
P2.1A - Calculate the average speed of an object using the change of position and elapsed time.	...calculate average speed, given position and elapsed time.	Guided Notes Practice problems Displacement Lab Activity
P2.1C - Create line graphs using measured values of position and elapsed time.	...create a line graph, given values of position and time.	Guided Notes Practice problems Displacement Lab Activity
P2.1D - Describe and analyze the motion that a position-time graph represents, given the graph.	...describe the motion of a position-time graph.	Guided Notes Practice problems Displacement Lab Activity
P2.2A - Distinguish between the variables of distance, displacement, speed, velocity, and acceleration.	...explain the difference between distance, displacement, speed, velocity, and acceleration.	Guided Notes Practice problems Class Demonstration
P2.2C - Describe and analyze the motion that a velocity-time graph represents, given the graph.	...describe the motion of a velocity-time graph, given the graph.	Guided Notes Practice problems Displacement Lab Activity

Key Vocabulary

Acceleration	Function	Relative Motion			
Average Speed	Graph	Scalar			
Circular Motion	Linear Motion	Speed			
Constant Acceleration	Motion	Time			
Displacement	Motion diagram	Vector			
Frame of Reference	Position	Velocity			

Instructor: Mike Maksimchuk	Course/Grade Level: Physics A	Week: 5
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Unit 2: Motion	Evidence of Learning/Assessments: Weekly Socratic Quiz, Unit Test
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Standards (Learning Targets)	" I can ---- "	Instructional Strategies
P2.1B - Represent the velocities for linear and circular motion using motion diagrams (arrows on strobe pictures).	...create strobe diagrams of different forms of motion.	Strobe Demonstration Guided Notes Motion Diagrams
P2.1g - Solve problems involving average speed and constant acceleration in one dimension.	...calculate speed, time, or acceleration in one dimension.	Guided Notes Practice Problems
P2.2B - Use the change of speed and elapsed time to calculate the average acceleration for linear motion.	...calculate acceleration for linear motion.	Guided Notes Practice Problems
P2.2e - Use the area under a velocity-time graph to calculate the distance traveled and the slope to calculate the acceleration.	...can find the area under the line segment of a graph. ...calculate the slope of a line.	Guided Notes Practice Problems
P2.3a - Describe and compare the motion of an object using different reference frames.	...describe motion in different frames of reference.	Class Discussion

Key Vocabulary

Acceleration	Function	Relative Motion			
Average Speed	Graph	Scalar			
Circular Motion	Linear Motion	Speed			
Constant Acceleration	Motion	Time			
Displacement	Motion diagram	Vector			
Frame of Reference	Position	Velocity			

Instructor: Mike Maksimchuk	Course/Grade Level: Physics A	Week: 6
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Unit 2: Motion	Evidence of Learning/Assessments: Weekly Socratic Quiz, Unit Test
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Standards (Learning Targets)	" I can ---- "	Instructional Strategies
P2.2g - Apply the independence of the vertical and horizontal initial velocities to solve projectile motion problems.	...solve projectile motion problems by breaking them down into vertical and horizontal components	MythBusters video on independence of axis Practice Problems Inquiry Labs Data-Collection Lab

Key Vocabulary

Acceleration	Function	Relative Motion	Average speed		
Average Speed	Graph	Scalar	Average acceleration		
Circular Motion	Linear Motion	Speed	Vertical velocity		
Constant Acceleration	Motion	Time	Horizontal velocity		
Displacement	Motion diagram	Vector	Projectile motion		
Frame of Reference	Position	Velocity	Projectile		

Instructor: Mike Maksimchuk	Course/Grade Level: Physics A	Week: 7
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Unit 2: Motion	Evidence of Learning/Assessments: Weekly Socratic Quiz, Unit Test
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Standards (Learning Targets)	" I can ---- "	Instructional Strategies
P2.2g - Apply the independence of the vertical and horizontal initial velocities to solve projectile motion problems.	...solve projectile motion problems by breaking them down into vertical and horizontal components	MythBusters video on independence of axis Practice Problems Inquiry Labs Data-Collection Lab
P2.3a - Describe and compare the motion of an object using different reference frames.	...describe motion in different frames of reference.	Laboratory Investigations

Key Vocabulary

Acceleration	Function	Relative Motion	Average speed		
Average Speed	Graph	Scalar	Average acceleration		
Circular Motion	Linear Motion	Speed	Vertical velocity		
Constant Acceleration	Motion	Time	Horizontal velocity		
Displacement	Motion diagram	Vector	Projectile motion		
Frame of Reference	Position	Velocity	Projectile		

Instructor: Mike Maksimchuk	Course/Grade Level: Physics A	Week: 8
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Unit 2.5: Projectile Motion	Evidence of Learning/Assessments: Weekly Socratic Quiz, Unit Test
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Standards (Learning Targets)	" I can ---- "	Instructional Strategies
P2.2g - Apply the independence of the vertical and horizontal initial velocities to solve projectile motion problems.	...solve projectile motion problems by breaking them down into vertical and horizontal components	MythBusters video on independence of axis Practice Problems Inquiry Labs Data-Collection Lab
P3.4e - Solve problems involving force, mass, and acceleration in two-dimensional projectile motion restricted to an initial horizontal velocity with no initial vertical velocity (e.g., a ball rolling on a table).	...use Newton's Laws to solve Projectile Motion Problems	Laboratory Investigations

Key Vocabulary

Position	Projectile motion	Mass			
Velocity	Projectile	Two-dimensional projectile motion			
Average speed	Acceleration due to gravity	Inclined plane			
Average acceleration	Proportional	Free-body diagrams			
Vertical velocity	Net Force				
Horizontal velocity	Inversely proportional				

Instructor: Mike Maksimchuk	Course/Grade Level: Physics A	Week: 9
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Unit 2.5: Projectile Motion	Evidence of Learning/Assessments: Weekly Socratic Quiz, Unit Test
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Standards (Learning Targets)	" I can ---- "	Instructional Strategies
P2.2g - Apply the independence of the vertical and horizontal initial velocities to solve projectile motion problems.	...solve projectile motion problems by breaking them down into vertical and horizontal components	MythBusters video on independence of axis Practice Problems Inquiry Labs Data-Collection Lab
P3.4e - Solve problems involving force, mass, and acceleration in two-dimensional projectile motion restricted to an initial horizontal velocity with no initial vertical velocity (e.g., a ball rolling on a table).	...use Newton's Laws to solve Projectile Motion Problems	MythBusters video on independence of axis Practice Problems Inquiry Labs Data-Collection Lab

Key Vocabulary

Position	Projectile motion	Mass		
Velocity	Projectile	Two-dimensional projectile motion		
Average speed	Acceleration due to gravity	Inclined plane		
Average acceleration	Proportional	Free-body diagrams		
Vertical velocity	Net Force			
Horizontal velocity	Inversely proportional			

Instructor: Mike Maksimchuk	Course/Grade Level: Physics A	Week: 10
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Unit 2.5: Projectile Motion	Evidence of Learning/Assessments: Weekly Socratic Quiz, Unit Test
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Standards (Learning Targets)	" I can ---- "	Instructional Strategies
P2.2g - Apply the independence of the vertical and horizontal initial velocities to solve projectile motion problems.	...solve projectile motion problems by breaking them down into vertical and horizontal components	MythBusters video on independence of axis Practice Problems Inquiry Labs Data-Collection Lab
P3.4e - Solve problems involving force, mass, and acceleration in two-dimensional projectile motion restricted to an initial horizontal velocity with no initial vertical velocity (e.g., a ball rolling on a table).	...use Newton's Laws to solve Projectile Motion Problems	MythBusters video on independence of axis Practice Problems Inquiry Labs Data-Collection Lab

Key Vocabulary

Position	Projectile motion	Mass			
Velocity	Projectile	Two-dimensional projectile motion			
Average speed	Acceleration due to gravity	Inclined plane			
Average acceleration	Proportional	Free-body diagrams			
Vertical velocity	Net Force				
Horizontal velocity	Inversely proportional				

Instructor: Mike Maksimchuk	Course/Grade Level: Physics A	Week: 11
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Unit 3: Dynamics	Evidence of Learning/Assessments: Weekly Socratic Quiz, Unit Test
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Standards (Learning Targets)	" I can ---- "	Instructional Strategies
P3.2A - Identify the magnitude and direction of everyday forces (e.g., wind, tension in ropes, pushes and pulls, weight).	...identify everyday force	Class Discussion Guided Notes
P3.2C - Calculate the net force acting on an object.	...calculate Net Force, using $F=m*a$	Guided Notes Practice Problems
P3.3A - Identify the action and reaction force from examples of forces in everyday situations (e.g., book on a table, walking across the floor, pushing open a door).	...identify action/reaction pairs	Guided notes Class Discussion
P3.4A - Predict the change in motion of an object acted on by several forces.	...predict the final motion of an object acted on by multiple forces	Guided Notes Practice Problems
P3.4C - Solve problems involving force, mass, and acceleration in linear motion (newton's Second law).	...use Newton's Laws	Guided Notes Practice Problems

Key Vocabulary

acceleration	direction of a force	forces at a distance	magnitude of a force	Proportional	vector
action/reaction forces	electric force	friction	mass	scalar	weak nuclear force
atoms	electromagnetic force	gravitational force	molecules	speed	weight
change in direction	equal & opposite force	inverse square law	net force	strong nuclear force	
change in speed	$F_{net}=ma$	inversely proportional	Newton's First Law	tension	
contact forces	force	linear motion	Newton's Second Law	velocity	

Instructor: Mike Maksimchuk	Course/Grade Level: Physics A	Week: 12
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Unit 3: Dynamics	Evidence of Learning/Assessments: Weekly Socratic Quiz, Unit Test
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Standards (Learning Targets)	" I can ---- "	Instructional Strategies
P3.2A - Identify the magnitude and direction of everyday forces (e.g., wind, tension in ropes, pushes and pulls, weight).	...identify everyday force	Guided Notes Practice Problems
P3.2C - Calculate the net force acting on an object.	...calculate Net Force, using $F=m*a$	Guided Notes Practice Problems
P3.3A - Identify the action and reaction force from examples of forces in everyday situations (e.g., book on a table, walking across the floor, pushing open a door).	...identify action/reaction pairs	Guided Notes Practice Problems
P3.4A - Predict the change in motion of an object acted on by several forces.	...predict the final motion of an object acted on by multiple forces	Guided Notes Practice Problems
P3.4C - Solve problems involving force, mass, and acceleration in linear motion (newton's Second law).	...use Newton's Laws	Guided Notes Practice Problems

Key Vocabulary

acceleration	direction of a force	forces at a distance	magnitude of a force	Proportional	vector
action/reaction forces	electric force	friction	mass	scalar	weak nuclear force
atoms	electromagnetic force	gravitational force	molecules	speed	weight
change in direction	equal & opposite force	inverse square law	net force	strong nuclear force	
change in speed	$F_{net}=ma$	inversely proportional	Newton's First Law	tension	
contact forces	force	linear motion	Newton's Second Law	velocity	

Instructor: Mike Maksimchuk	Course/Grade Level: Physics A	Week: 13
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Unit 3: Dynamics	Evidence of Learning/Assessments: Weekly Socratic Quiz, Unit Test
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Standards (Learning Targets)	" I can ---- "	Instructional Strategies
P3.2A - Identify the magnitude and direction of everyday forces (e.g., wind, tension in ropes, pushes and pulls, weight).	...identify everyday force	Guided Notes Practice Problems
P3.2C - Calculate the net force acting on an object.	...calculate Net Force, using $F=m*a$	Guided Notes Practice Problems
P3.3A - Identify the action and reaction force from examples of forces in everyday situations (e.g., book on a table, walking across the floor, pushing open a door).	...identify action/reaction pairs	Guided Notes Practice Problems
P3.4A - Predict the change in motion of an object acted on by several forces.	...predict the final motion of an object acted on by multiple forces	Guided Notes Practice Problems
P3.4C - Solve problems involving force, mass, and acceleration in linear motion (newton's Second law).	...use Newton's Laws	Guided Notes Practice Problems

Key Vocabulary

acceleration	direction of a force	forces at a distance	magnitude of a force	Proportional	vector
action/reaction forces	electric force	friction	mass	scalar	weak nuclear force
atoms	electromagnetic force	gravitational force	molecules	speed	weight
change in direction	equal & opposite force	inverse square law	net force	strong nuclear force	
change in speed	$F_{net}=ma$	inversely proportional	Newton's First Law	tension	
contact forces	force	linear motion	Newton's Second Law	velocity	

Instructor: Mike Maksimchuk	Course/Grade Level: Physics A	Week: 14
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Unit 4: Momentum	Evidence of Learning/Assessments: Weekly Socratic Quiz, Unit Test
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Standards (Learning Targets)	" I can ---- "	Instructional Strategies
P3.4g - Explain how the time of impact can act the net force (e.g., air bags in cars, catching a ball).	...calculate force, and change of momentum. Explain what impulse is	Guided Notes Practice Problems In-Class Demonstration
P3.5a - Apply conservation of momentum to solve simple collision problems.	...solve problems involving multiple masses and speeds	Guided Notes Practice Problems
P3.3b - Predict how the change in velocity of a small mass compares to the change in velocity of a large mass when the objects interact (e.g., collide).	....solve simple collision problems with conservation of momentum.	Guided Notes Practice Problems Class Discussion
P3.3c - Explain the recoil of a projectile launcher in terms of forces and masses. (application)	... use conversavtion of momentum to explain recoil and "kickback"	Guided Notes Practice Problems
P3.3d - Analyze why seat belts may be more important in autos than in buses. (application)	...use the knowledge of momentum to explain why busses don't have seat belts.	Class Discussion

Key Vocabulary

Acceleration	Law of Conservation of Momentum	Projectile			
Average velocity	Mass	Proportional			
Change in velocity	Momentum	Vector			
Collision	Net Force	Velocity			
$F_{net}=ma$	Newton's Second Law				
Inversely proportional	Newton's Third Law				

Instructor: Mike Maksimchuk	Course/Grade Level: Physics A	Week: 15
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Unit 4: Momentum	Evidence of Learning/Assessments: Weekly Socratic Quiz, Unit Test
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Standards (Learning Targets)	" I can ---- "	Instructional Strategies
P3.4g - Explain how the time of impact can affect the net force (e.g., air bags in cars, catching a ball).	...I can explain why we need air bags	Guided Notes Practice Problems In-Class Demonstration
P3.5a - Apply conservation of momentum to solve simple collision problems.	.... Explain what will happen in a collision, using conservation of momentum	Guided Notes Practice Problems
P3.3b - Predict how the change in velocity of a small mass compares to the change in velocity of a large mass when the objects interact (e.g., collide).	.... Explain what will happen in a collision, using conservation of momentum	Guided Notes Practice Problems Class Discussion
P3.3c - Explain the recoil of a projectile launcher in terms of forces and masses. (application)	.... Explain what will happen in a projectile, using conservation of momentum	Guided Notes Practice Problems
P3.3d - Analyze why seat belts may be more important in autos than in buses. (application)	....explain why a bus doesn't have seat belts	Class Discussion

Key Vocabulary

Acceleration	Law of Conservation of Momentum	Projectile			
Average velocity	Mass	Proportional			
Change in velocity	Momentum	Vector			
Collision	Net Force	Velocity			
$F_{net}=ma$	Newton's Second Law				
Inversely proportional	Newton's Third Law				

Instructor: Mike Maksimchuk	Course/Grade Level: Physics A	Week: 16
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Unit 5: Periodic Motion	Evidence of Learning/Assessments: Weekly Socratic Quiz, Unit Test
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Standards (Learning Targets)	" I can ---- "	Instructional Strategies
P2.1h - Identify the changes in speed and direction in everyday examples of circular (rotation and revolution), periodic, and projectile motions.	...differentiate between rotation, revolution, periodic motion, and projectile motion.	Guided Notes Practice Problems
P2.1F - Distinguish between rotation and revolution and describe and contrast the two speeds of an object like the Earth. (application)	...differentiate between rotation, revolution, periodic motion, and projectile motion.	Class Discussion
P2.2D - Explain how uniform circular motion involves acceleration without a change in speed.	...explain what acceleration is	Guided Notes Class Discussion
P2.2f - Describe the relationship between changes in position, velocity, and acceleration during periodic motion.	...describe what is going on in periodic motion	Guided Notes Practice Problems
P3.4D - Identify the force(s) acting on objects moving with uniform circular motion (e.g., a car on a circular track, satellites in orbit). (Links to Unit 6, Gravity)	...identify forces in circular motion	Class Discussion Guided Notes

Key Vocabulary

Acceleration	Force	Motion	Revolution	Velocity	
Average acceleration	Gravitation	Net force	Rotation		
Average speed	Inverse Square Law	Orbital motion	Speed		
Circular motion	Law of Universal Gravitation	Periodic motion	Time		
Direction	Magnitude	Position	Uniform circular motion		
Elliptical orbit	Mass	Projectile	Vector		

Instructor: Mike Maksimchuk	Course/Grade Level: Physics A	Week: 17
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Unit 5: Periodic Motion	Evidence of Learning/Assessments: Weekly Socratic Quiz, Unit Test
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Standards (Learning Targets)	" I can ---- "	Instructional Strategies
P2.1h - Identify the changes in speed and direction in everyday examples of circular (rotation and revolution), periodic, and projectile motions.differentiate between rotation, revolution, periodic motion, and projectile motion.	Guided Notes Practice Problems
P2.1F - Distinguish between rotation and revolution and describe and contrast the two speeds of an object like the Earth. (application)	....differentiate between rotation, revolution, periodic motion, and projectile motion.	Class Discussion
P2.2D - Explain how uniform circular motion involves acceleration without a change in speed.	...explain what acceleration is	Guided Notes Class Discussion
P2.2f - Describe the relationship between changes in position, velocity, and acceleration during periodic motion.	....describe what is going on in periodic motion	Guided Notes Practice Problems
P3.4D - Identify the force(s) acting on objects moving with uniform circular motion (e.g., a car on a circular track, satellites in orbit). (Links to Unit 6, Gravity)	...identify forces in circular motion	Class Discussion Guided Notes

Key Vocabulary

Acceleration	Force	Motion	Revolution	Velocity	
Average acceleration	Gravitation	Net force	Rotation		
Average speed	Inverse Square Law	Orbital motion	Speed		
Circular motion	Law of Universal Gravitation	Periodic motion	Time		
Direction	Magnitude	Position	Uniform circular motion		
Elliptical orbit	Mass	Projectile	Vector		

