

Planned Course: Honors Physics Unit # 5: Circular Motion Estimated Time: 4 weeks	Course Number: 403H Grade Level: 11/12 Level/Track: Honors/AP	Department: Science Board Approval Date: August 27, 2018	
Big Ideas / PA Academic Standards	<ul style="list-style-type: none"> ● Core Concepts (in question format) <ul style="list-style-type: none"> ● Skills/Knowledge 	Activities/Strategies/Study Skills (identify some activities as remedial or enrichment activities)	Assessments (include types and topics)
<p>Big Ideas:</p> <p>Big Idea 1: Objects and systems have properties such as mass and charge. Systems may have internal structure.</p> <p>Big Idea 2: Fields existing in space can be used to explain interactions.</p> <p>Big Idea 3: The interactions of an object with other objects can be described by forces.</p> <p>Big Idea 4: Interactions between systems can result in changes in those systems.</p> <p>PA Academic Standards:</p> <p>3.2.10.B1:</p> <p>Apply Newton’s Law of Universal Gravitation to the forces between two objects.</p> <p>Standard - 3.2.P.B1:</p>	<ul style="list-style-type: none"> ➤ What quantities are used for measuring circular motion? <ul style="list-style-type: none"> ● Relate radians to degrees. ● Calculate the angular displacement using the arc length and the distance from the axis of rotation. ● Calculate angular speed or angular acceleration. ● Solve problems using the kinematic equations for rotational motion. ➤ What is the difference between tangential and centripetal speed/acceleration? <ul style="list-style-type: none"> ● Find the tangential speed of a point on a rigid rotating object using the angular speed and the radius. ● Solve problems involving tangential acceleration. 	<p>Jupiter’s Moons Virtual Lab</p> <ul style="list-style-type: none"> ● Students will do research on Jupiter and four of its moons. Based on this research, students will mathematically determine the mass of Jupiter. They will compare this value to the accepted value for the mass of Jupiter. <p>Introduction to Circular Motion Lab</p> <ul style="list-style-type: none"> ● When velocity is kept constant, what is the relationship between the radius of circular motion and the period of circular motion? The speed? The acceleration? <p>Circular Motion Station Lab</p> <ul style="list-style-type: none"> ● Students will work through stations in which they investigate various aspects of circular motion through station activities (car on a string, figure skater, Ferris wheel, etc). 	<p>Hands on laboratory assessments (Intro to Circular Motion Lab, Circular Motion Station Lab)</p> <p>Lab Simulations (Jupiter’s Moons Virtual Lab, Portions of Circular Motion Station Lab).</p> <p>Quizzes on major concepts.</p> <p>Homework to reinforce major concepts.</p> <p>Unit Test.</p>

<p>Differentiate among translational motion, simple harmonic motion, and rotational motion in terms of position, velocity, and acceleration.</p>	<ul style="list-style-type: none"> ● Solve problems involving centripetal acceleration. <p>➤ What causes circular motion?</p> <ul style="list-style-type: none"> ● Calculate the force that maintains circular motion. ● Explain how the apparent existence of an outward force in circular motion can be explained as the inertia resisting the force that maintains circular motion. ● Apply Newton's Universal Law of Gravitation to find the gravitational force between two masses. 	<p>Merry-Go-Round Demonstration</p> <ul style="list-style-type: none"> ● Students link hands and engage in circular motion to demonstrate the concepts of tangential velocity, angular velocity, angular displacement, etc. <p>Problem Solving Examples and Guided Practice</p> <p>Class discussion and guided note taking</p>	
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