

<b>Planned Course: Physics I</b>	<b>Course Number: S403</b>	<b>Department: Science</b>	
<b>Unit: Circular Motion</b>	<b>Grade Level: 11-12</b>		
<b>Estimated Time: 5 weeks</b>	<b>Level/Track:</b>	<b>Date Approved: 8/24/09</b>	
<b>PA Academic Standards</b>	<b>Core Concepts (in question format)</b> • <b>Skills/Knowledge</b>	<b>Activities/Strategies/Study Skills</b> (identify some activities as remedial or enrichment activities)	<b>Assessments</b> (include types and topics)

<p>3.1.12 Unifying Themes</p> <p>B. Apply concepts of models as a method to predict and understand science and technology. C. Assess and apply patterns in science and technology. D. Analyze scale as a way of relating concepts and ideas to one another by some measure. E. Evaluate change in nature, physical systems and man made systems.</p> <p>3.2.12 Inquiry and Design</p> <p>A. Evaluate the nature of scientific and technological knowledge. B. Evaluate experimental information for appropriateness and adherence to relevant science processes. C. Apply the elements of scientific inquiry to solve multi step problems.</p> <p>3.4.12 Physical Science, Chemistry and Physics</p> <p>C. Apply the principles of motion and force. D. Analyze the essential ideas about the composition an structure of the universe.</p> <p>3.7.12 Technological Devices</p>	<p>► What is a radian?</p> <ul style="list-style-type: none"> <li>Define radians in terms of radius and included arc length.</li> <li>Relate radian measure to degree measure.</li> <li>Calculate angles when given arc length and radius.</li> <li>Express angles in degrees and/or radians.</li> </ul> <p>► What is angular displacement?</p> <ul style="list-style-type: none"> <li>Define rotational displacement in terms of an angle expressed in radians.</li> <li>Calculate angular displacement given starting and finishing angles.</li> <li>Convert between radian, degree and revolution measure of rotation.</li> </ul> <p>► What is angular speed?</p> <ul style="list-style-type: none"> <li>Define rotational speed in terms of angular displacement per unit time.</li> <li>Make calculations of rotational speed from displacement and time data.</li> </ul> <p>► What angular acceleration?</p> <ul style="list-style-type: none"> <li>Define angular acceleration as the change in angular speed per unit time.</li> <li>Calculate angular acceleration</li> </ul>	<ul style="list-style-type: none"> <li>Study text</li> <li>Take notes on additional explanations from lectures</li> <li>Do homework problems from text and worksheets</li> <li>Take notes on explanations from lectures.</li> <li>Engage in discussions of momentum and its use in defining motion.</li> <li>Demonstrate problem solving techniques at the blackboard.</li> <li>Do computer research on momentum.</li> <li>Answer homework questions from text and/or worksheets. (Ch 10 pgs 182 thru 187, Ch 12 pgs 227 thru 231, Ch 14 pgs 277 thru 281)</li> <li>Use scientific method while performing laboratory experiments.</li> <li>In first lab study Centripetal Force</li> <li>Study text Chapter(s) 10,</li> </ul>	<ul style="list-style-type: none"> <li>Completion of homework.</li> <li>Discussion of homework assignments.</li> <li>Class participation in discussions of topics surrounding everyday events illustrating the assignments.</li> <li>Written reports of laboratory exercises.</li> <li>Class participation</li> <li>Written Chapter test</li> <li>Written pop quiz(s)</li> <li>Written reports of laboratory exercises</li> <li>Teacher observation of performance in LAB environment.</li> <li>Computer modeling of problems using IP</li> </ul>
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<p>A. Apply advanced tools materials and techniques to answer complex questions.</p> <p>B. Evaluate appropriate instruments and apparatus to accurately measure materials and processes.</p> <p>D. Evaluate the effectiveness of computer software to solve specific problems.</p>	<p>from velocity change data and time interval data.</p> <ul style="list-style-type: none"> <li>▶ Can kinematic equations for rotational motion be compared to those for linear motion? <ul style="list-style-type: none"> <li>• Draw parallels between the kinematic equations for linear motion and those for rotational motion.</li> <li>• Using rotational motion equations calculate angular displacement, velocity and acceleration.</li> </ul> </li> <li>▶ What is tangential speed? <ul style="list-style-type: none"> <li>• Use the relationship between radius and arc length to calculate tangential speed from angular speed.</li> </ul> </li> <li>▶ What is tangential acceleration? <ul style="list-style-type: none"> <li>• Define tangential acceleration as change in tangential speed per unit time.</li> <li>• make calculations of tangential acceleration from changes in tangential speed and time interval.</li> </ul> </li> <li>▶ What is centripetal acceleration? <ul style="list-style-type: none"> <li>• Define centripetal acceleration as having a direction toward the center of the circle.</li> </ul> </li> </ul>	<p>12 and 14 "Circular Motion"</p> <ul style="list-style-type: none"> <li>• Perform laboratory experiments dealing with: Circular Motion and its causes.</li> </ul>	
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		<ul style="list-style-type: none"> <li>• Skills/Knowledge</li> </ul>	(identify some activities as remedial or enrichment activities)	(include types and topics)	
		<ul style="list-style-type: none"> <li>• make calculations of the magnitude of centripetal acceleration using <math>a_c=vt^2/r</math>.</li> <li>▶ What is centripetal force? <ul style="list-style-type: none"> <li>• Use Newton's 2nd law to define the magnitude of centripetal force as <math>F_c=mv^2/r</math>.</li> <li>• Describe centripetal force as having a direction toward the center of the circle.</li> <li>• Discuss the concept that without centripetal force, there would be no turning of any moving object.</li> </ul> </li> <li>▶ What is so-called centrifugal force and what is it really? <ul style="list-style-type: none"> <li>• Explain how centrifugal force is misnamed and is really a reaction to centripetal force caused by inertia of the object.</li> <li>• Explain how with a lack of centripetal force, objects would proceed in straight tangential lines.</li> </ul> </li> <li>▶ What is the Universal Law of Gravity? <ul style="list-style-type: none"> <li>• Describe gravity as the attraction that all matter has for all other matter.</li> <li>• Describe how universal gravity exists everywhere, even in outer space.</li> </ul> </li> </ul>			

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		<ul style="list-style-type: none"> <li>Skills/Knowledge</li> </ul>			
		<ul style="list-style-type: none"> <li>Describe the concept of apparent weightlessness.</li> <li>Make calculations of gravitational attraction using <math>F_g = Gm_1m_2/d</math></li> <li>Discuss the inverse square relationship.</li> </ul>			
				<ul style="list-style-type: none"> <li>Discussion of new vocabulary words</li> <li>Direct instruction (lecture)</li> <li>Handouts (on file or teacher made)</li> <li>Worksheets (on file or teacher made)</li> <li>Text problems</li> <li>Practice problems</li> <li>Class discussion</li> <li>Labs and demonstrations</li> </ul>	
				<ul style="list-style-type: none"> <li>Teacher observation in class</li> <li>Teacher observation in lab</li> <li>Class participation</li> <li>Homework completed</li> <li>Quizzes (teacher made)</li> <li>Tests (on file or teacher made)</li> <li>Lab reports (student or teacher generated)</li> </ul>	