Unit Lesson Plan – Uniform Circular Motion			
Teacher:	**<Teacher>**	**Time Frame:**	**8 days**
Grade:	**9**	**School:**	**<School>**
Subject:	**PSI Algebra Based Physics**		

NGSS DCI:	The topics in this unit are an essential part of understand the later units and of physics as a whole.
AP Physics 1 and 2 Standards:	• This essential knowledge does not produce a specific learning objective but serves as a foundation for other learning objectives in the course.

Essential Questions
(What questions will the student be able to answer as a result of the instruction?)
1. How do we use Free Body diagrams and Newton's Laws to solve circular motion problems? 2. What are the applications of circular motion? 3. How does apparent weight vary during circular motion?

Knowledge & Skills	
(What skills are needed to achieve the desired results?)	
By the end of this unit, students will know: • How to relate the radius of the circle and the speed or rate of revolution of the particle to the magnitude of the centripetal acceleration. • How to describe the direction of the particle's velocity and acceleration at any instant during the motion. • How to analyze situations in which an object moves with specified acceleration under the influence of one or more forces so they can determine the magnitude and direction of the net force, or of one of the forces that makes up the net force, in situations such as the following: (1) Motion in a horizontal circle (e.g., mass on a rotating merry-go-round, or car rounding a banked curve). (2) Motion in a vertical circle (e.g., mass swinging on the end of a string, cart rolling down a curved track, rider on a Ferris wheel).	By the end of this unit, students will be able to: • Learn various concepts and ideas related to circular motion. They will use the following equations in solving problems. ○ $a= v^2/r$ ○ $v = 2\pi r/T$ ○ $T= 1/f$ ○ $F = ma$

Note that this **exact** Smart Notebook presentation has not been used in the classroom, although all of the material has. The pacing below is approximate based on a 40-45 minute class period. Feel free to adjust as necessary and please provide your feedback!

Assessment

(What is acceptable evidence to show desired results (rubrics, exam, etc.)? Attach Copy

During the Smart Notebook lesson designed to introduce concepts, students will be continually questioned on these concepts using a combination of class work/homework questions and the SMART Response system. Classwork and Homework questions will be discussed as a class and misconceptions will be addressed by the teacher prior to the formal evaluations listed below.

- Centripetal Force Lab Quiz
- Uniform Circular Motion Test

Other assessments on the NJCTL website are optional and can be used as needed.

(What is the sequence of activities, learning experiences, etc, that will lead to desired results (the plan)?

Day	Topic	Classwork	Homework**
1	Period and Frequency	Presentation to slide 23 Problems 1-3	Problems 4-6
2	Velocity and Acceleration	Presentation slide 24-51 Problems 7,8	Problems 9,10 MC 1-6
3	Dynamics of UCM	Presentation slide 52-61 Problems 11-16	Problems 17-22 MC 7-20
4	Bucket on a string	Presentation 75-86 Problems 23, 24	Problems 25, 26 MC 21-30
5	Free Response Problems	Problems 27-31 & 37	Problems 32-36 & 38
6	Centripetal Force Lab	Lab	Study for Lab Quiz
7	Review MC	Centripetal Force Lab Quiz & Review	Study for test
8	Test	Test	N/A

* It may not be possible to complete labs in the order stated due to lab schedules. Other labs on the NJCTL website are option and can be used as needed.

**HW Problems are currently not scaffolded from least to most difficult, but are instead listed in order of topic. Teacher should pay special attention at the end of each class period when assigning HW so that only problems related to the topic that was taught are being assigned.