

Unit 7 Plan: **Center of Gravity, Torque and Uniform Circular Motion**
 Physics1 @ PalmHarborUniversityHigh



Day	Date	Topic	Assignments Due / Schedule
1		Notes on Center of Gravity/Mass	Read Section 8.3, pages 211-213
2		Notes on Torque Torque Problems Handout	Read Section 8.2, pages 201-204 Finish Torque Problems
3		Torque Lab	
4		Notes on Uniform Circular Motion CW #1: 12-15 p.156	Read Section 6.2, pages 153-156 HW #1: p.166 # 61, 62
5		Review worksheet	Finish W/S
6		Review	
7		Unit Test	

Note: Homework is due on the day following the assignment, unless otherwise noted.

Objectives / Essential Learnings: (key terms in **bold**)

- Describe **center of gravity**.
- Predict whether an object will topple, given the location of the center of gravity and the area of support of the object.
- Distinguish among **stable equilibrium**, **unstable equilibrium**, and **neutral equilibrium**.
- Give examples of how a human is affected by the need to keep the body's center of gravity over the support base.
- Define **torque** and describe what it depends on.
- Describe the condition for one torque to balance another. Define **rotational equilibrium**.
- Tell whether the forces on an object will produce rotation, given the location of the center of gravity of the object and the position and direction of the forces.
- Demonstrate the ability to solve problems using the formulas for balancing torques.
- Distinguish between **rotate** and **revolve**. Relate **period**, **frequency** and **uniform circular motion**
- Distinguish between **linear speed** or **tangential speed** and **rotational speed** and explain what each depends on.
- Give examples of a **centripetal force**.
- Define **centripetal acceleration** for objects in circular motion and be able to apply Newton's Laws to such motion.

Rotational equilibrium: $\sum \tau = 0$ or Torque (τ) = Force \times lever arm $\tau = F_{\perp} \times d$

$$\tau_{ccw} = \tau_{cw}$$

(linear speed) $v = \frac{2\pi r}{T}$ $period = \frac{1}{frequency}$ $T = \frac{1}{f}$

(centripetal acceleration) $a_c = \frac{v^2}{r}$ (centripetal force) $F_c = ma_c = \frac{mv^2}{r}$