Unit 12 Physics Themed – Vocabulary and Equations – Rollercoaster Work/Energy

$E_i = E_f$ (conservation of energy) $GPE = mgh$ $KE = ½mv^2$ $ME = KE + GPE$ $Wt = mg$ $W = Fd$ $P = W/t$ $AMA = F_o/F_i$ $IMA = d_i/d_o$ $Eff. = W_o/W_i$ $Eff. = P_o/P_i$ $f = \mu N$ $F_{net} = ma$ $a_c = v^2/r$ $F_c = ma_c$ (circ.) g's $= a_c/9.8$ x = circumference $= 2\pi r$ $v = \sqrt{(2g\Delta h)} = \sqrt{(19.6\Delta h)}$	$v = \frac{\Delta x}{\Delta t}$ $a = \frac{\Delta v}{\Delta t}$ $\Delta x = v_0 \Delta t + ½ at^2$ $v_f^2 = v_i^2 + 2a \Delta x$ $v_f = v_0 + a \Delta t$ $\Delta x = v_x \Delta t$ $v_{yi} = v \sin\Theta$ $v_x = v \cos\Theta$ $p = mv$ $p_i = p_f$ $(m_1v_1 + m_2v_2)_I = (m_1v_1 + m_2v_2)_f$ $I = \Delta p = m\Delta v = F\Delta t$					
		Equation	**a**	***t***	$\mathbf{v_{yi}}$	$\mathbf{v_{yf}}$	$\mathbf{\Delta y}$
		$\mathbf{v_{yf} = v_{yi} + at}$	√	√	√	√	☹
		$\mathbf{\Delta y = \frac{(v_{yi} + v_{yf})}{2} t}$	☹	√	√	√	√
		$\mathbf{\Delta y = v_{yi}t + ½at^2}$	√	√	√	☹	√
		$\mathbf{v_{yf}^2 = v_{yi}^2 + 2a\Delta y}$	√	☹	√	√	√

1609 m = 1 mi	*60 mph = 27 m/s*	*1 hp = 746 W*	*1 lb = 0.4536 kg*	*1 mi = 1609 m*	*1 W-s = 1 J*	*1 ft = 0.3048 m*

Symbols:
PE, KE, GPE, m, g, h, v

Vocabulary:
Joule
Newton
Kinetic energy
Potential energy
Gravitational potential energy
Mechanical energy
Elastic potential energy
Chemical energy
Nuclear energy
Electrical energy
Internal energy
Deformation energy
Sound energy
Light energy
Thermal energy
Total energy
Efficiency
Friction
Conservation of energy
Frictionless
Pendulum
Perpetual motion machine
Work

Unit Objectives - Williams

1. I understand all the vocabulary & math of this unit and all demos, videos, equations, and class assignments; I remember objectives & vocabulary from previous units.
2. I understand what conservation energy means including common examples of real world exchanges of energy
3. I can to track the exchange energy for masses moving up and down hills while ME remains constant
4. Compute/graph energy totals & categories using GPE, KE, ME including using correct units and including how changes in mass, speed and height change the results
5. Compute weight/mass
6. Identify and understand other forms of energy in unambiguous situations
7. Follow energy flow in pendulums and rollercoasters including consequential changes in speed and position when heights are changed as well as novel situations; understand why first hill must be tallest
8. I can account for, but not directly calculate for friction/thermal energy including the unavoidable energy flow in that direction
9. I understand how to use each of the math equations, including what situations to use them, variable names, units and assumptions