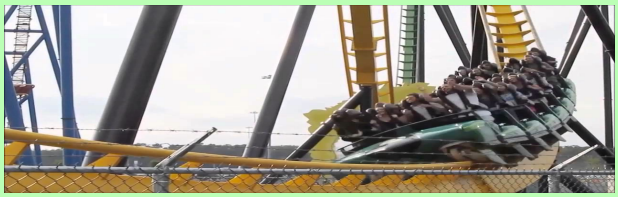
Announcements and Upcoming Events

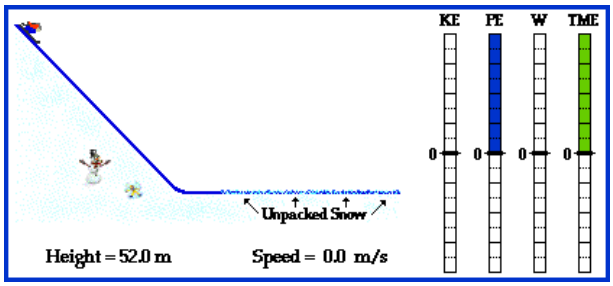
PRACTICE	LABS	TESTS
Unit 11 PP's (1-10) Work-Energy Worksheet	Roller Coaster Interactive (RsVCP)	Unit 11 Test Friday (3/8/19)

Work Done By Nonconservative Forces

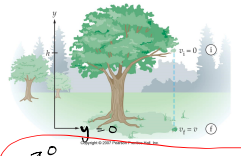
Learning Target	Description
11.3	I can analyze and solve problems involving the Law of Conservation of Energy and the work done by nonconservative forces.



Conservation of Energy



Work Done by Nonconservative Forces



Deep in the forest, a 17.0-g leaf falls from a tree and drops straight to the ground. If its initial height was 5.30 m and its speed on landing was 1.3 m/s, how much nonconservative work was done on the leaf?

$KE_i^{\nearrow 0} + PE_i + W_{ext} = KE_f + PE_f^{\searrow 0}$

$mgh + W_{nc} = \frac{1}{2}mv^2$

$(0.017)(9.8)(5.3) + W_{nc} = \frac{1}{2}(0.017)(1.3)^2$

$0.88\,J + W_{nc} = 0.014\,J$

$-0.88 \qquad -0.88$

$W_{nc} = -0.87\,J$

Work Done by Nonconservative Forces

8. Ralphie's mass is 28 kg. He slides down a slide that is 4.8-m tall and reaches a velocity of 3.2 m/s at the bottom of the slide. How much work was done by friction on Ralphie?

9. A 600-kg roller coaster car (includes passenger mass) is moving at 20.0 m/s. The hydraulic braking system in the track applies an external force to slow the car to a speed of 5.0 m/s over a distance of 20.0 meters. Determine the force that acts upon the car.

Work Done by Nonconservative Forces

8. Ralphie's mass is 28 kg. He slides down a slide that is 4.8-m tall and reaches a velocity of 3.2 m/s at the bottom of the slide. How much work was done by friction on Ralphie?

$KE_i^{\nearrow 0} + PE_i + W_{ext} = KE_f + PE_f^{\searrow 0}$

$mgh + W_{nc} = \frac{1}{2}mv^2$

$W_{nc} = \frac{1}{2}mv^2 - mgh$

$W_{nc} = -1200\,J$

Work Done by Nonconservative Forces

9. A 600.0 kg roller coaster car (includes passenger mass) is moving at 20.0 m/s. The hydraulic braking system in the track applies an external force to slow the car to a speed of 5.0 m/s over a distance of 20.0 meters. Determine the force that acts upon the car.

$KE_i + \cancel{PE_i} + W_{ext} = KE_f + \cancel{PE_f}$

$\frac{1}{2}mv_o^2 + F_f \cdot d = \frac{1}{2}mv_f^2$

$F_f \cdot d = \frac{1}{2}mv_f^2 - \frac{1}{2}mv_o^2$

$F_f \cdot d = -112{,}500\ J$

$d = 20\ m$

$F_f = -5600\ N$