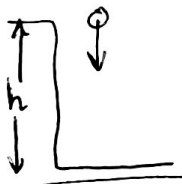
Name_____ Period_____ Date_____

11. A roller coaster system has a potential energy of 640,000 J at its highest point. How fast will the roller coaster car be traveling at half its height?

12. A stone with a mass of 6 kg falls off a cliff that is 120 m tall. What is speed at which it strikes the ground?

$m = 6\,kg$
$h = 120\,m$
$g = 9.8\,m/s^2$



$PE_i = mgh$
$= 6 \cdot 9.8 \cdot 120$
$= 7{,}056\ J$

$PE_f = mgh$
$= 6 \cdot 9.8 \cdot 0$
$= 0\ J$

$PE_i + KE_i = PE_f + KE_f$
$7{,}056 + 0 = 0 + KE_f$
$7{,}056 = KE_f$
$KE_f = \frac{1}{2}mv^2$
$7{,}056 = \frac{1}{2}(6)v^2$

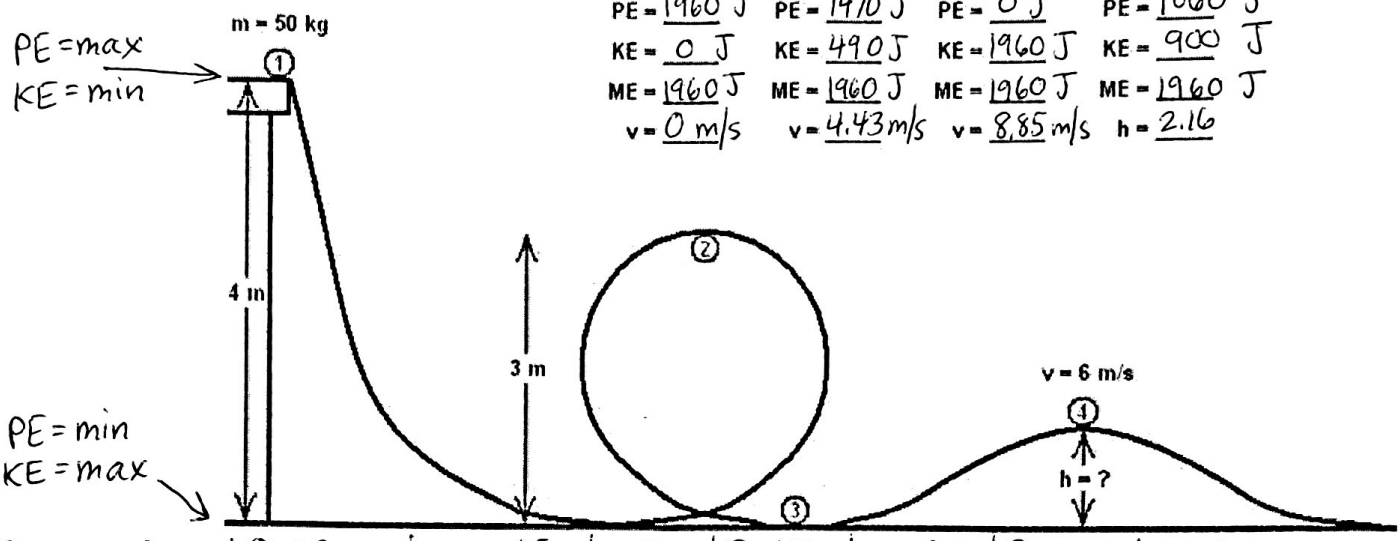
$7{,}056 = 3v^2$
$2{,}352 = v^2$
$\sqrt{2{,}352} = \sqrt{v^2}$
$v = 48.497\ m/s$
$v = 48.50\ m/s$

Use Work and Power worksheet to review Work and Power!

Name_____ Period_____ Date_____

9. Use the following diagram to calculate the potential energy (PE), kinetic energy (KE), mechanical energy (ME), and height (h), and/or velocity (v) at each point.

①	②	③	④
PE = 1960 J	PE = 1470 J	PE = 0 J	PE = 1060 J
KE = 0 J	KE = 490 J	KE = 1960 J	KE = 900 J
ME = 1960 J	ME = 1960 J	ME = 1960 J	ME = 1960 J
v = 0 m/s	v = 4.43 m/s	v = 8.85 m/s	h = 2.16



① $PE = mgh$
$= 50 \cdot 9.8 \cdot 4$
$= 1960\ J$

$KE = 0\ J$

$ME = PE + KE$
$= 1960 + 0$
$= 1960\ J$

② $PE = mgh$
$= 50 \cdot 9.8 \cdot 3$
$= 1470\ J$

$ME = PE + KE$
$1960 = 1470 + KE$
$-1470 \quad -1470$
$490\ J = KE$

$KE = \frac{1}{2}mv^2$
$490 = \frac{1}{2}(50)v^2$
$490 = 25v^2$
$\frac{490}{25} = \frac{25v^2}{25}$
$19.6 = v^2$
$\sqrt{19.6} = \sqrt{v^2}$
$v = 4.43\ m/s$

③ $KE = \frac{1}{2}mv^2$
$1960 = \frac{1}{2}(50)v^2$
$1960 = 25v^2$
$\frac{1960}{25} = \frac{25v^2}{25}$
$78.4 = v^2$
$\sqrt{78.4} = \sqrt{v^2}$
$v = 8.85\ m/s$

④ $KE = \frac{1}{2}mv^2$
$KE = \frac{1}{2}(50)(6)^2$
$KE = 25 \cdot 36$
$KE = 900\ J$

$ME = PE + KE$
$1960 = PE + 900$
$-900 \quad -900$
$1060 = PE$

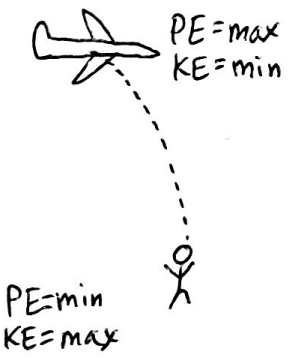
$PE = mgh$
$1060 = 50 \cdot 9.8 \cdot h$
$1060 = 490h$
$\frac{1060}{490} = \frac{490h}{490}$
$2.16_m = h$

10. A skydiver with a mass of 80 kg is on an airplane flying at an altitude of 1,000 m. Neglecting air resistance, how fast will the skydiver strike a soft landing target down below?

$m = 80\ kg$
$h = 1{,}000\ m$
$g = 9.8\ m/s^2$

$PE_i = mgh$
$= 80 \cdot 9.8 \cdot 1{,}000$
$= 784{,}000\ J$

$PE_i + KE_i = PE_f + KE_f$
$784{,}000 + 0 = 0 + KE_f$
$784{,}000 = KE_f$



$KE_f = \frac{1}{2}mv_f^2$
$784{,}000 = \frac{1}{2}(80)v_f^2$
$784{,}000 = 40v_f^2$
$\frac{784{,}000}{40} = \frac{40v_f^2}{40}$
$19{,}600 = v_f^2$

$\sqrt{19{,}600} = \sqrt{v_f^2}$

$\boxed{v_f = 442.72\ m/s}$

Name_____ Period_____ Date_____

Energy, Work, and Power Review
Test Dates: Black – 11/16/17, Gold – 11/17/17

1. Define Potential Energy - stored energy

2. Name each variable and units in the following equation

$$PE = mgh$$

Potential Energy J	mass Kg	gravity 9.8 m/s²	height m

3. Ramiro is sitting at the top of a waterslide that is 12 m high. If his mass is 85 kg, what is his potential energy?

h = 12m g = 9.8 m/s²
m = 85 Kg
PE = ?

PE = mgh
PE = (85)(9.8)(12)

PE = 9996 J

4. Define Kinetic Energy - energy of motion

5. Name each variable and units in the following equation

$$KE = \frac{1}{2}mv^2$$

Kinetic Energy J	mass Kg	velocity m/s

6. A baby bird falls out of its nest at a velocity of 14.7 m/s. If the bird's mass is 0.114 kg, what is its kinetic energy as it hits the ground?

v = 14.7 m/s
m = 0.114 Kg
KE = ?

KE = ½ mv²
KE = ½ (0.114)(14.7)²

KE = 12.3171 ≈ 12.32 J

7. How do you find the mechanical energy of a system? By adding PE and KE

8. The potential energy of a skier going down a mountain slope is 1.5×10^5 J and her kinetic energy is 1.5×10^5 J. What is the mechanical energy of the skier?

PE = 1.5×10^5 J
KE = 1.5×10^5 J

ME = PE + KE
ME = $1.5 \times 10^5 + 1.5 \times 10^5$
ME = 300,000 J
or
ME = 3.0×10^5 J