1. PE, KE, PEel, W, or No Energy?		2. Is Energy Added (+W), Removed (-W), or Transferred (T)	
+W Compressing a spring	PE An object above the ground.	-W Slowing down an object.	+W Speeding up an object.
-W Friction acting on an object.	KE An object moving.	+W Lifting an object into the air.	T A moving object compressing a spring.
O An object at rest on the ground.	PEel A compressed spring.	-W Lowering an object to the ground slowly.	+W A force compressing a spring.
+W Pushing an object.	PE+KE An object as it is falling.	T An object falling.	T An object slides up a frictionless ramp.

3. For each of the following, develop the Conservation of Energy Equation

A. *A moving object speeds up.*
E_{before} = KE Work? = +W E_{after} = KE
Conservation of Energy Equation: KE + W = KE

B. *An object is dropped. There is air friction.*
E_{before} = PE Work? = -W E_{after} = KE
Conservation of Energy Equation: PE - W = KE

C. *A moving object compresses a spring.*
E_{before} = KE Work? = ____ E_{after} = PEel
Conservation of Energy Equation: KE = PEel

D. *An object is thrown up, going 2 m/s. How high does it go?*
E_{before} = KE Work? = 0 E_{after} = PE
Conservation of Energy Equation: KE = PE

E. *A relaxed spring is compressed.*
E_{before} = O Work? = +W E_{after} = PEel
Conservation of Energy Equation: W = PEel

F. *A spring causes an object to move.*
E_{before} = PEel Work? = 0 E_{after} = KE
Conservation of Energy Equation: PEel = KE

G. *An object slides down a frictionless ramp.*
E_{before} = PE Work? = 0 E_{after} = KE
Conservation of Energy Equation: PE = KE

H. *An object is dropped. How fast is it going part way down?*
E_{before} = PE Work? = 0 E_{after} = KE
Conservation of Energy Equation: PE = KE

4. A 5 kg mass at rest on the ground is raised up to 15 m. Find the work that was done on the object.

A. E_{before} = O Work? = +W E_{after} = PE

B. Conservation of Energy equation: W = PE

C. Solve.
PE = mgh
5kg · 10m/s² · 15m
750J

5. A 8 kg mass going 2 m/s compresses a spring 0.5 meters. Find the spring constant of the spring.

A. E_{before} = KE Work? = O E_{after} = PEel

B. Conservation of Energy equation: KE = PEel

C. Solve.
½mv² = ½kx²
8kg · (2m/s)² = k(.5)²
8.4 = .25 k = 128 N/m

6. A 6 kg mass going 4 m/s is slowed to 3 m/s by a 2 N force. For how much distance did the force act?

A. E_{before} = KE Work? = -W E_{after} = KE

B. Conservation of Energy equation: KE - W = KE

C. Solve.
½mv² - Fd = ½mv²
½ 6kg · (4m/s)² - 2N · d = ½ 6kg · (3m/s)²
d = 10.5

7. A mass at rest is dropped from 12 m in the air. How fast is it going 2 m above the ground?

A. E_{before} = PE Work? = O E_{after} = PE+KE

B. Conservation of Energy equation: PE = PE + KE

C. Solve.
mgh = mgh + ½mv² mass doesn't matter
10m/s² · 12m = 10m/s² · 2m + ½(v)²
120 = 20 ½(v)² 100 = ½(v)² v² = 200
v = 14.1 m/s

8. Use the law of conservation of energy (assume no friction nor air resistance) to determine the kinetic and potential energy at the various marked positions along the roller coaster track below. Finally, fill in the bars of the bar charts for positions A, B, C, D, and E.