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Physics
gPE and ePE

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gPe is gravitational potential energy when gravity moves in object.
ePe is the elastic potential energy is the energy that is stored in an object because of the position.

Tips/Tricks-

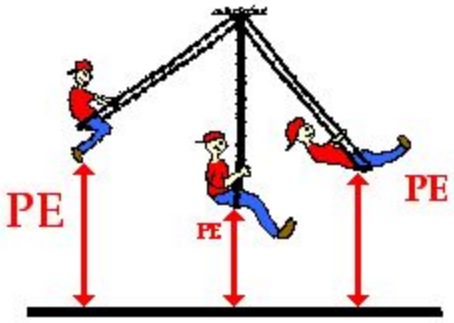
- g is gravity
- e is elastic
- potential energy is between two particles
- particles lose potential energy

Formula for gPe. $gPe=m*g*h$
Formula for ePe. $1/2kd_2$

Picture:

Elastic-

Gravitational-



Examples-

1. If the force to stretch a spring is given as F = (250 N/m)x, then what is the potential energy of the spring if it is stretched 5 meters from rest?

Solution: Here k = 100N/m and x = 2 m. Therefore:
EPE = $(1/2)kx^2$ = $(1/2)(250N/m)(5\ m)^2$ = **625 Joules**

2. A block of mass 4.0 kg rests on a table. If its gravitational potential energy is 0 Joules now, what will its gravitational potential energy be when it is raised 2.0 meter above the table?
Solution: m = 4.0 kg, h = 2.0 m, g = 10 m/s^2
GPE = mgh = $(4.0\ kg)(10\ m/s^2)(2.0\ m)$ = 80 Joules

Practice problems-

1. A cat had climbed at the top of a building. The building is 100 meters high and the cat weighs 10kg. How much potential energy does the cat have? m = 10 kg, h = 100 m, g = 9.8 m/s^2

2. A mass of 25 kg is moved a distance of 35 m at an angle of 20o to a gravitational field of intensity 9.8 Nkg-1. Calculate the change in gravitational energy. Change in gravitational potential energy = 25x9.8x35cos 20 = 8057 J

3. A crane lifts a load of 300 kg through a distance of 2.5 m onto a truck. Calculate the gain in gravitational potential energy.

4. An object is attached to the lower end of a 100-coil spring that is hanging from the ceiling. The string stretches by 0.165 m. The spring is then cut into two identical springs of 50 coils each. Each spring is attached between the ceiling and the object. By how much does each spring stretch?

5. A mass sitting on a horizontal frictionless surface is attached to one end of spring; the other end of the spring is fixed to a wall. To compress the spring by 0.12 m requires 3.0 J of work. If the mass is released from rest with the spring compressed, it experiences a maximum acceleration of 15 m/s/s. Find the value of the spring constant.