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**IDX G9 PHYSICS H STUDY GUIDE ISSUE 6**

**By TaeYun K. and Eric W.**

6-3 Kinetic energy and work-energy principle

1. Kinetic energy (Translational kinetic energy)
   1. Energy
      1. Traditional way: the ability to do work.
      2. The ability of an object to produce a change in itself or the world around
   2. Translational KE
      1. Definition – the energy of motion
      2. Symbol – KE
      3. Unit – J (Joule)
      4. Formula
2. Work-energy principle
   1. Formula:
   2. Statement: The net work done on an object is equal to the change in the object’s kinetic energy
   3. The work-energy principle is valid only if W is the net work done on the object

6-4 Potential energy

1. Potential energy: the energy associated with forces that depend on the position or configuration of an object relative to the surroundings.
2. Forms of PE:
   1. Gravitational potential energy
      1. Definition: The stored energy in a system resulting from the gravitational force between Earth and the object.
      2. Symbol: or
      3. Formula: ,
         1. m = mass
         2. g = acceleration due to gravity
         3. h = height above reference level
      4. Work done by external force to move the object from point 1 to point 2 (with no acceleration) = change in potential energy
      5. PE belongs to a system and not a single object
         1. PE is associated with a force
         2. Force on one object is always exerted by some other object
   2. Elastic Potential Energy
      1. Definition: the stored energy in an object as a result of its change in shape
      2. E.g. rubber bands, springs
      3. Hooke’s Law
         1. Statement: The spring force is directly proportional to the displacement of the spring and opposite in the direction of the spring
         2. Formula: ,
            1. k: spring stiffness constant
            2. x: distance stretched/compressed