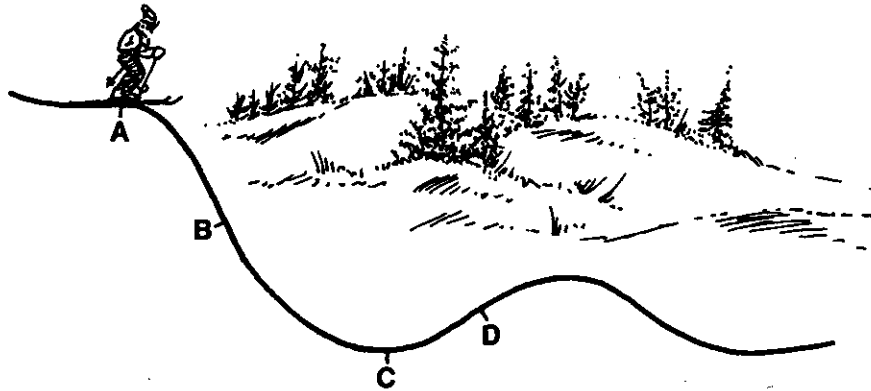


## KINETIC AND POTENTIAL ENERGY CHANGES ANSWERS!!

2.



Label the points at which:

  B   The skier is gaining speed

  C   The point at which the skier is moving the fastest

  A   The point at which the skier has the greatest amount of potential energy

  B   The point at which the potential energy is changing to kinetic energy

  C   The point at which the skier has the greatest amount of kinetic energy

  D   The point at which kinetic energy is changing to potential energy

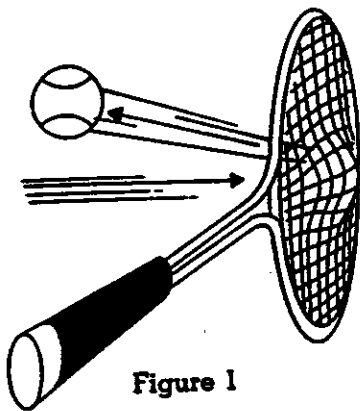
Explain why the skier will never return to the height of point A.

*Because PE D can never equal PE A, because you will always lose some energy.....*

Where and how is mechanical energy “lost?”

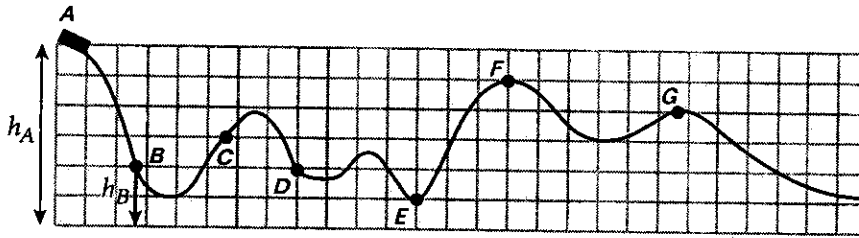
*You lose the energy because of friction, and it turns into heat.*

A tennis ball undergoes several energy changes as it travels towards a player, is struck, and rapidly speeds back over the net. Describe these energy changes using the concepts of kinetic and potential energy. *The ball has all kinetic energy, as it strikes the racket, its energy turns into elastic potential, and then back to kinetic energy again.*



**Figure 1**

## CONSERVATION OF ENERGY DIAGRAM SKILLS



A roller coaster with a mass of  $m$  moves along a smooth track as diagrammed in the graph. The car leaves point A with no initial velocity and travels to other points along the track. The zero energy level is taken as the energy of point A.

- 1a) What is the car's kinetic energy at point A?  $KE_A = 0$
  - b) What is the potential energy associated with the car at point A?  $PE_A = mgh_A$
  - c) What is the car's kinetic energy at point B?  $KE_B = PE_A - PE_B = \frac{1}{2}mv^2$
  - d) What is the car's potential energy at point B?  $PE_B = mgh_B$
- 2a) What is the speed of the car at point A?  $v_A = 0$
  - b) What is the speed of the car at point B?  $v_B = \sqrt{2KE_B/m} = \sqrt{2(mgh_A - mgh_B)/m}$
3. Assume the mass of the car is 65 kg, and it starts at 30 m above the ground (each square is 5 m). Use the graph above to find the kinetic energy, potential energy, and velocity for points C, D, E, F, G

Location	$KE_A$	$PE_A = mgh$	$KE_{\text{location}}$	$PE_{\text{location}}$	$V_{\text{location}}$
A	0	$65(9.8)(30)$	0	19 110 J	0
B	0	19 110 J	$19\ 110 - 6370 = 12740$ J	$65(9.8)10 = 6370$ J	19.79
C	0	19 110 J	$19\ 110 - 9555 = 9555$ J	$65(9.8)15 = 9555$ J	17.1
D	0	19 110 J	$19\ 110 - 6370 = 12740$ J	$65(9.8)10 = 6370$ J	19.79
E	0	19 110 J	$19\ 110 - 3185 = 15925$ J	$65(9.8)5 = 3185$ J	22.1
F	0	19 110 J	$19\ 110 - 15925 = 3185$ J	$65(9.8)25 = 15925$ J	9.89
G	0	19 110 J	$19\ 110 - 12740 = 6370$ J	$65(9.8)20 = 12740$ J	14

4. For each location, what do you notice about the sum of the kinetic and potential energies? *It remains constant....*