

Name: \_\_\_\_\_ Date: \_\_\_\_\_

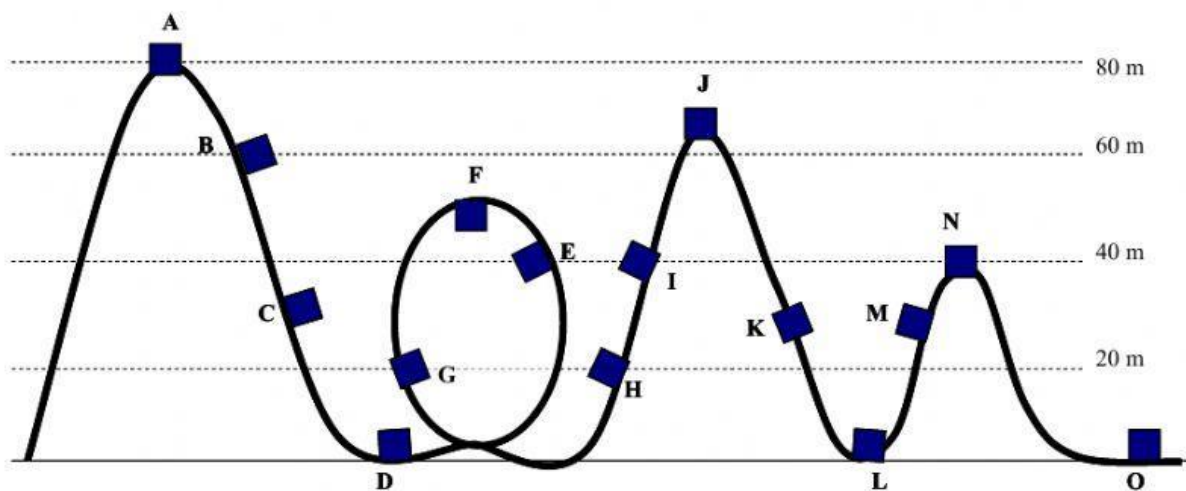
## UNIT 5 Work, Power, & Energy

### Law of Conservation of Energy

According to the law of conservation of energy, “In a closed system, the total energy of an object remains constant (TOT E never changes), however the types of energy can change—one form of energy can be transformed into other forms of energy”. In the following scenarios, gravity is affecting the moving objects and friction is zero. TOT E remains constant but the proportions of GPE and KE change.

- Total Energy = Gravitational Potential Energy + Kinetic Energy = 100%
- The percentage of GPE and KE can change as object moves down or up, but the total energy remains constant.
- Assume no friction (loss of energy by heat)

**Energy on a Roller Coaster.** The diagram shows a rollercoaster with three hills and one loop. The solid black line is the roller coaster track. The solid squares are the train at different positions on the track. The roller coaster train moves from position A (atop the tallest hill) over the track to the end of the ride beyond position O, from position A → BCDEFGHIJKLMN → O over a series of hills and a loop. The dashed horizontal lines show the absolute heights of the roller coaster track above the ground's surface.



Correctly match the energy distribution to the position of the roller coaster train. Type the letter into the boxes. Options may be used more than once.

- A TOT E = 100% GPE + 0% KE
- B TOT E = 80% GPE + 20% KE
- C TOT E = 75% GPE + 25% KE
- D TOT E = 60% GPE + 40% KE

- E TOT E = 50% GPE + 50% KE
- F TOT E = 35% GPE + 65% KE
- G TOT E = 25% GPE + 75% KE
- H TOT E = 0% GPE + 100% KE

\_\_\_\_\_ 1. Position A

\_\_\_\_\_ 9. Position I

\_\_\_\_\_ 2. Position B

\_\_\_\_\_ 10. Position J

\_\_\_\_\_ 3. Position C

\_\_\_\_\_ 11. Position K

\_\_\_\_\_ 4. Position D

\_\_\_\_\_ 12. Position L

\_\_\_\_\_ 5. Position E

\_\_\_\_\_ 13. Position M

\_\_\_\_\_ 6. Position F

\_\_\_\_\_ 14. Position N

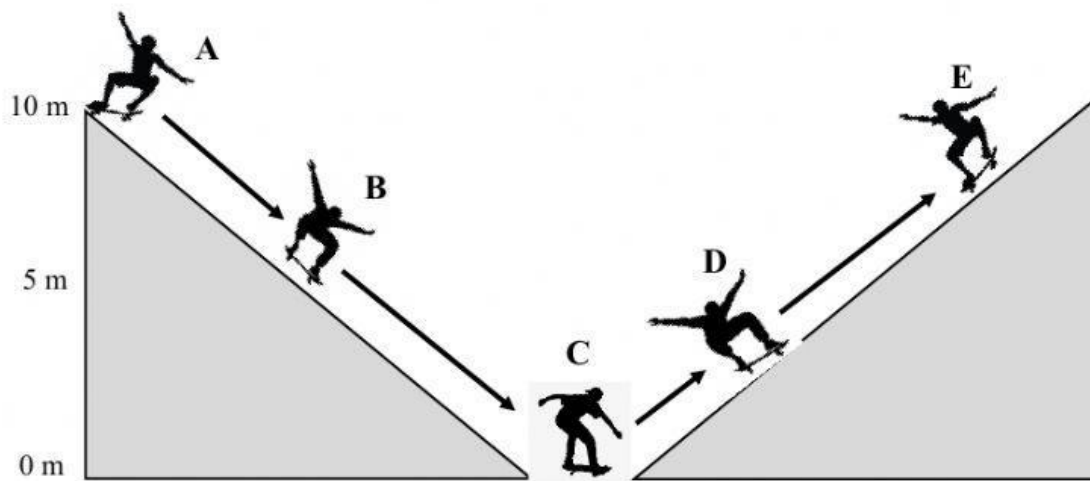
\_\_\_\_\_ 7. Position G

\_\_\_\_\_ 15. Position O

\_\_\_\_\_ 8. Position H

**Skating the U.** Seymore the Skater skates the U at the skate park. He starts at position A, and skates to Position E. The height is based on the bottom of the skateboard. Correctly match the energy distribution to the position of the roller coaster train. Type the letter into the boxes. Options may be used more than once.

- A TOT E = 100% GPE + 0% KE
- B TOT E = 75% GPE + 25% KE
- C TOT E = 50% GPE + 50% KE
- D TOT E = 25% GPE + 75% KE
- E TOT E = 0% GPE + 100% KE



\_\_\_\_\_ 16 Position A

\_\_\_\_\_ 17. Position B

\_\_\_\_\_ 18. Position C

\_\_\_\_\_ 19. Position D

\_\_\_\_\_ 20. Position E