

Kinetic and Potential Energy Assignment

1. What is the initial KE of a 0.50 mg flea that leaves the ground at a speed of 30 cm/s?
2. A carbon atom of mass 1.99×10^{-26} kg has 4.64×10^{-19} J of kinetic energy. How fast is it moving?
3. How much work does it take to accelerate an electron ($m = 9.11 \times 10^{-31}$ kg) from rest to 5.0×10^6 m/s?
4. How much work must be done to stop a 1000 kg car travelling at 100 km/h?
5. A 4.3 kg monkey swings from one branch to another 1.3 m higher. What is the change in potential energy?
6. A 1.80 m tall person lifts a 280 g book so it is 2.45 m off the ground. What is the potential energy of the book relative to
 - a) ground
 - b) the top of the person's head
 - c) How is the work done by the person related to the answers in part a) and b)?
7. A 65 kg hiker starts at an elevation of 1600 m and climbs to the top of a 2800 m peak.
 - a) What is the hiker's change in potential energy?
 - b) What is the minimum work required of the hiker?
 - c) Can the actual work done be more than this? Explain. (BONUS)
8. Tia has a weight of 500 N. She climbs to the top of a slide which is 3 m above the ground. Calculate how much gravitational potential energy she has gained in moving from the ground to the top of the slide.
9. Tim uses a force of 50 N to lift a suitcase 0.50 m onto a shelf. What is the gravitational potential energy of the suitcase?
10. A car travelling 1.4 m/s has a kinetic energy of 2000 J. What is its kinetic energy at 2.8 m/s?
11. (BONUS) If the KE of a particle is doubled, by what factor has its speed increased?
12. (BONUS) If the speed of a particle is doubled, by what factor has its KE increased?