Name: _____
Date: _____ Block: _____

Calculating Energy HW

1. What is the kinetic energy of an 80 kg football player running at 8 m/s?

2. What is the mass of a dart that that has 2 J of kinetic energy and is thrown at 20 m/s?

3. What is the kinetic energy of the space shuttle (mass = 68,000 kg) when it is orbiting the Earth at 13,000 m/s?

4. What is the kinetic energy of a bolt (0.002 kg) -lost off the space shuttle in a previous flight- floating in space at 13,000 m/s?

5. If the bolt lost off the space shuttle above hit a astronaut at 13,000 m/s, it would feel like a 105 kg running at what velocity? (Hint: Use energy to solve.)

6. What is the kinetic energy of a 20,000 kg locomotive traveling at 2 m/s?

7. How fast must a 0.0050 kg bullet travel if it is to have the same kinetic energy as a 20,000 kg locomotive traveling at 2 m/s?

8. A 7.3 kg gallon paint can is lifted 1.78 meters vertically to a shelf. What is the change in potential energy of the paint can?

9. A roller coaster car of mass 465 kg rolls up a hill with a vertical height of 75 m from the ground. What is the change in potential energy relative to the ground?

10. A 783 kg elevator rises straight up 164 meters. What is the change in potential energy of the elevator relative to the ground?

11. Determine the amount of potential energy of a 5.0-N book that is moved to three different shelves on a bookcase. The height of each shelf is 1.0 m, 1.5 m, and 2.0 m.

12. A 78-kg skydiver has a speed of 62 m/s at an altitude of 870 m above the ground.

a. Determine the kinetic energy possessed by the skydiver.

b. Determine the potential energy possessed by the skydiver.

13. Ima Scaarred (m=56.2 kg) is traveling at a speed of 12.8 m/s at the top of a 19.5-m high roller coaster loop.

a. Determine Ima's kinetic energy at the top of the loop.

b. Determine Ima's potential energy at the top of the loop.

14. The Top Thrill Dragster stratacoaster at Cedar Point Amusement Park in Ohio uses a hydraulic launching system to accelerate riders from 0 to 53.6 m/s (120 mi/hr) in 3.8 seconds before climbing a completely vertical 420-foot hill.

a. Jerome (m=102 kg) visits the park with his church youth group. He boards his car, straps himself in and prepares for the thrill of the day. What is Jerome's kinetic energy before the acceleration period?

b. The 3.8-second acceleration period begins to accelerate Jerome along the level track. What is Jerome's kinetic energy at the end of this acceleration period?

c. Once the launch is over, Jerome begins screaming up the 420-*foot*, completely vertical section of the track. Determine Jerome's potential energy at the top of the vertical section.