Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Physics 11

**Worksheet 7.4**

**Conservation of Energy**

Solve the following problems without using kinematics.

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| 1. A physics student is dropped (don’t ask why, or you’re next). If they reach the floor at a speed of 3.2 m/s, from what height did they fall? 2. A heavy object is dropped from a vertical height of 8 m. What is its speed when it hits the ground? 3. A bowling ball is dropped from the top of a building. If it hits the ground with a speed of 37 m/s, how tall was the building? 4. A safe is hurled down from the top of a 130 m building at a speed of 11 m/s (initially). What is its velocity as it hits the ground? | 1. A box slides down the frictionless ramp shown. If it starts at rest, what is its speed at the bottom?      1. A pendulum is dropped from the position shown, 0.25 m above its equilibrium position. What is the speed of the pendulum bob as it passes through its equilibrium position?      1. A box slides down a frictionless incline as shown. If the box starts from rest, what is its speed at the bottom. |
| 1. A roller coaster car starts from rest at point A. What is its speed at point C if the track is frictionless?      1. A 2.5 kg object is dropped from a height of 10 m above the ground. Calculate the speed of the object as it hits the ground. | 1. An 80 kg student running at 3.5 m/s grabs a rope that is hanging vertically. How high will the student swing? 2. A pendulum is 1.2 m long. If the pendulum is pulled until it makes a 25o angle with the vertical, what is the speed of the pendulum bob when it passes through its equilibrium position? HINT: First, determine the vertical drop of the pendulum. |

Answers: 1) 0.522 m 2) 12.5 m/s 3) 69.8 m 4) 51.7 m/s 5) 8.85 m/s 6) 2.21 m/s

7) 10.8 m/s 8) 12.5 m/s 9) 14 m/s 10) 0.625 m 11) 1.48 m/s