Potential Energy, Kinetic Energy, and Conservation of Energy Practice NAME:_____

**Reflection and Self-Assessment**

**Part 1:** Circle the statement that best describes how you completed the practice:

- I answered all questions without using the online solutions. I checked my answers against the key at the back of the practice and was able to determine my mistakes and correct them without referring to the online solutions.

- I answered most questions correctly without using the online solutions. I used the online solutions to help me with some questions and was able, with help from the online solutions, to understand every question and answer them correctly.

- I used the online solutions to help me with most of the questions. I was able, with help from the online solutions, to understand each question and answer them correctly.

- Even using the online solutions, I was not able to fully understand the solution to some problems. The questions I had trouble with were:

  _____

- I did not attempt all the questions on the practice.

**Part 2:** Circle the statement that best describes your confidence in answering questions of this type in the future.

- I am confident I can answer nearly any question of this type correctly without using notes or other assistance.

- I am confident I can answer **MOST** questions of this type correctly without using notes or other assistance.

- I am **NOT** confident I can answer most questions of this type correctly without using notes or other assistance.

**Part 3:** Circle the statement below that best describes the total amount of time you spent actively working on this practice:

| | | | | |
|---|---|---|---|---|
| Less than an hour | Between one and two hours | Between two and three hours | Between three and four hours | More than four hours |

Potential Energy, Kinetic Energy, and Conservation of Energy Practice NAME:_____

1. What is the potential energy of a 25kg block which is 15m above the ground?

2. How much work must be done to lift a 25kg block to a height of 15m above the ground?

3. What is the kinetic energy of a 25 kg block which is moving at 15 m/s?

4. How fast is an 85 kg person running if they have 1100 J of kinetic energy?

5. An 850 kg car increases its velocity from rest to 25.0 m/s.
    a. What is the initial kinetic energy of the car?

    b. What is the final kinetic energy of the car?

    c. What is $\Delta E_k$?

6. An 850 kg car increases its velocity from 25.0 m/s to 50.0 m/s.
    a. What is the initial kinetic energy of the car?

    b. What is the final kinetic energy of the car?

    c. What is $\Delta E_k$?

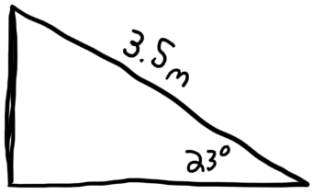
    d. Does it take more energy to increase velocity from 0 to 25m/s or from 25 m/s to 50 m/s?

7. A 25 kg block is dropped from a height of 5.0m. We want to determine how fast it will be moving when it hits the ground.

    a. Method 1: Use kinematics to determine how fast it will be moving when it hits the ground.

    b. Method 2: Use conservation of energy (kinetic energy at the end will equal potential energy at the start) to determine how fast it will be moving when it hits the ground.

8. A 34 kg block is pushed up a 3.5m long, 23° frictionless incline at a constant velocity. We want to know how much work is needed to push the block up the incline.

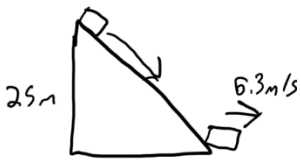



   a. Method 1: Determine the force needed to push the block at a constant velocity (this will be equal to $F_{g||}$) and use $W = Fd$ to determine the amount of work needed to push the block 3.5m.

   b. Method 2: Use trigonometry to determine how high the block will be off the ground at the end of the 3.5m incline then use $E_p = mgh$ to determine the work needed to push the block to that height.

Potential Energy, Kinetic Energy, and Conservation of Energy Practice NAME:_____

9. A 56kg sled, initially a rest on a 25m high hill, slid down. At the bottom of the hill the sled was moving at 6.3 m/s.




   a. What was the potential energy of the sled at the top of the hill?

   b. What was the potential energy at the bottom of the hill?

   c. What was the change in potential energy?

   d. What was the kinetic energy of the sled at the top of the hill?

   e. What was the kinetic energy at the bottom of the hill?

   f. What was the change in kinetic energy?

   g. Determine how much heat was generated by friction. (This will be all the potential energy at the start which didn't get transformed into kinetic energy).

10. A kid on a krazy carpet slides down a 15.0m tall hill. If the total mass of the kid and the carpet is 19kg and they are moving at 12.0 m/s at the bottom of the hill how much heat was generated?

11. A 0.750 kilogram rubber ball is dropped from a height of 1.50 m. If 2.0 J of energy is lost during the interaction of the ball with the floor, how high will the ball bounce up from the floor?

12. A 65 kg person is running along a gym floor with a speed of 3.5 m/s. She grabs on to a rope hanging from the ceiling of the gym and swings from the end of the rope.

    a. Determine the initial kinetic energy of the person.

    b. Determine how high they will swing if all of their kinetic energy is converted into potential energy.

13. We wish to determine how far a 50.0 kg object can move along a surface with μ=0.12 at a constant velocity using 500.0 J of energy.
    a. Determine the force of friction acting on the object using the formula $F_{fric} = \mu F_N$

    b. Solve for displacement using the formula $W = Fd$.

14. A 12 kg object initially moving at 25 m/s is slowed by friction. $\mu$ between the object and the floor is 0.46. We wish to determine how far it will travel before it stops without using kinematics.

    a. Determine the initial kinetic energy of the object.

    b. Determine the force of friction acting on the object.

    c. All of the initial kinetic energy from the object will be converted to heat by friction. Use $W = Fd$ to determine how far the object will move before stopping.

Potential Energy, Kinetic Energy, and Conservation of Energy Practice NAME:_____

Potential Energy, Kinetic Energy, and Conservation of Energy Practice NAME:_____

| **Answer Key** | | | | |
|---|---|---|---|---|
| 1) 3700 J | 2) 3700 J | 3) 2800 J | 4) 5.1 m/s | 5a) 0 J |
| 5b) $2.7 \times 10^5$ J | 5c) $2.7 \times 10^5$ J | 6a) $2.7 \times 10^5$ J | 6b) $1.1 \times 10^6$ J | 6c) $8.0\times 10^5$ J |
| 6d) More energy to speed up from 25 m/s to 50 m/s | 7a) 9.9 m/s | 7b) 9.9 m/s | 8a) 460 J | 8b)460 J |
| 9a) 14 000 J | 9b) 0 J | 9c) -14 000 J | 9d) 0 | 9e) 1 100 J |
| 9f) + 1 100 J | 9g) 13 000 J | 10)1 400 J | 11) 1.2 m | 12a) $4.0\times 10^2$ J |
| 12b) 0.63 m | 13a) 59 N | 13b) 8.5 m | 14a) 3800 J | 14b) 54 N |
| 14c) 69 m | | | | |