Energy Grade Check – Chapter 8 (Physical Science – Physics)

I. Review Questions.

1. Work is required to lift a barbell. How many times more work is required to lift the barbell 3 times as high?

2. What does it mean to have "conservation of energy"?

3. How does WORK differ from POWER? Explain.

4. Suppose a car has 2000 J of kinetic energy. When it moves twice as fast, what will be its kinetic energy?

5. When would the efficiency of a system ($\frac{W_{output}}{W_{input}} \mathbf{x\ 100}$) be 100%?

II. Plug and Chug.

1. Calculate the work done when a 20-N force pushes a cart 2.5 m.

2. Calculate the work done in lifting a 500-N barbell 2.2 m above the floor. What is the potential energy of the barbell when it is lifted to this height?

3. Calculate the power expended when the barbell from Problem 2 is lifted 2.2 m in 2.0 seconds.

4. Calculate the change in potential energy of 8 million kg of water dropping 50 m over Niagara Falls.

5. Referring to Problem 4, calculate the power available at the bottom of Niagara Falls.

6. Calculate the kinetic energy of a 3-kg toy cart that moves at 4 m/s. Calculate the kinetic energy of the same cart with twice the speed.

7. What is the efficiency of cyclist when she expends 1500 J of work to do 750 J of useful work?

III. Think – Explain – Solve.

1. Does an object with momentum always have energy? Justify your answer.

2. Does an object with energy always have momentum? Justify your answer.

3. If a mouse and an elephant both run with the same kinetic energy, can you say which is running faster? Explain in terms of the equation **KE = (1/2m)(v^2)**.

4. What are two reasons why a rock projected with a sling shot will go faster if the rubber is stretched an extra distance?

5. Label the picture below of a swinging pendulum and explain IN DETAIL how it illustrates the Law of Conservation of Energy.