Unit 2 Quiz

Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

*Part I: Read each question carefully. Choose the correct answer (1 pt each).*

1. Temperature is the measure of the total kinetic energy of all the molecules in a substance.

1. True
2. False

2. Jenny's kitten, Mousse, has a mass of 3.3 kg. Jenny has a mass of 62.6 kg. What is the gravitational force between Jenny and Mousse if they stand 0.5 m apart?

1. 413\*G
2. 826\*G
3. 65.6\*G
4. 207\*G

3. Suppose a bridge with steel expansion joints experiences a dramatic 25oC temperature drop. Will the steel expand or contract?

1. Expand
2. Contract

4. The Fury 325 has a maximum speed of 153 km/hr. What is the maximum kinetic energy of a 500 kg car at that speed? Remember that 1 Joule=1 kg **m^2/s^2!**

1. 5852250 J
2. 10625 J
3. 903125 J
4. 451563 J

5. Energy transfer is always spontaneously from areas of high temperature to areas of low temperature.

1. True
2. False

6. A worker uses a block and tackle system to lift a load of lumber weighing 1000 N. If she applies 200 N of force and pulls on 5 m of rope, how much will the lumber rise up off the ground?

1. 5 m
2. 10 m
3. 2 m
4. 1 m

*Part II: Solve each problem completely and show your work.*

1. Which is more powerful: A 400 W engine or an engine that does 300 J of work in 0.5 seconds? Explain your answer. (2 points)

2. The Twilight Zone Tower of Terror is an intense haunted elevator ride at Walt Disney World. At certain points during the ride, the rider experiences a sensation of weightlessness. During these moments is the elevator accelerating downward or upward? (2 points)

3. A chunk of ice of mass m on the Ravenel Bridge breaks off at a height h. What is the proper expression for the velocity of the ice before it hits the water? In other words, solve for velocity in terms of gravity and height using the law of conservation of mechanical energy. (3 points)

4. How much heat would a stove have to supply to 100 g of bacon to raise the temperature of the bacon from 10oC to 75oC? The specific heat capacity of bacon is 2 kJ/(kgoC). (2 points)

5. A tortilla chip is burned beneath 100 g of water in a flask. As the chip burns, the temperature of the water increases from 22oC to 72oC. Assuming that 40% of the heat released by burning the chip went into the water (a fair assumption), how many calories (not Calories!) are in the tortilla chip? The specific heat capacity of water is 1.0 calories/(g oC). (5 points)