Work and Energy Review Questions

1. How much work will you do if you lift a 0.67 kg object from a table up a distance of 1.5 m to a shelf?
2. If you push a 75 N block along a floor a distance of 4.2m at a steady pace, and the coefficient of kinetic friction is 0.40, how much work will you do on the block?
3. How much gravitational energy is gained by a 45 kg girl if she climbs 6.0 m up a flight of stairs?
4. How much work is done on a 750 kg load of bricks by a bricklayer if he carried the bricks upward to a height of 8.2 m to repair a chimney?
5. If a hair dryer does 3000 J of work to heat the air every two seconds, what is its power?
6. How much electrical energy is used by a 100 W light bulb if it was accidentally left on for 8.0 h?
7. Discuss the scientific accuracy of this statement: “I used a ramp to get my motorbike up on a truck and the ramp saved me a lot of work”.
8. One Watt is equivalent to 1 J/s, so a joule is the same as a watt∙second. How many joules are there in 1kW∙h?
9. A skier has 60 kJ of gravitational potential energy when at the top of a hill. Assuming no friction, how much kinetic energy does she have when she is one third the way down the hill?
10. What is the kinetic energy of a 60.0 g tennis ball that is travelling at

**a)** 10.0 m/s? **b)** 25.0 m/s?

1. How much kinetic energy does a 1.0 x 103 kg car travelling at 90 km/hr have?
2. The head of a golf club transfers a certain amount of kinetic energy to a golf ball upon impact. Let this be EK. If the golfer lightens the mass of the club head by 1/3, and increases the club head speed so that it is 3 times its previous speed, how much kinetic energy will be transferred to the ball now?
3. How much gravitational potential energy would a 275.0 g book have if it was placed on a shelf **a)** 2.60 m high? **b)** 1.80 m high? **c)** 0.30 m high?
4. What percentage of its gravitational potential energy does a squash ball lose if it falls from 3.0 m and returns to a height of 0.76 m after bouncing once?
5. A 1.00 kg book falls 0.75 m from a desk to the floor. How much potential energy did the book lose?
6. A 5.0 kg rock is dropped from a height of 92.0 m. What are the kinetic energy and the gravitational potential energy when the rock is 40.0 m from the ground?
7. Tarzan grabs a vine 12m long and swings on the end of it, like a pendulum. His starting point is 5.0 m above the lowest point in his swing. How fast is Tarzan moving as he passes through the bottom of the swing?
8. What are the 3 potential forms of kinetic energy that a molecule could have?
9. By what method could heat be transferred without the presence of matter?
10. Convert the following:
    1. 100°C \_ \_\_\_\_\_\_ K
    2. –25°C \_ \_\_\_\_\_\_ K
    3. –273°C \_ \_\_\_\_\_\_ K
    4. 0°C \_ \_\_\_\_\_\_ K
    5. 57 K \_ \_\_\_\_\_\_ °C
    6. 300 K \_ \_\_\_\_\_\_ °C
11. How much heat energy is gained per kilogram of water when it is heated from 10.0°C to 90.0°C?
12. A 400.0 g aluminum cooking pot is heated from 25.0°C to 99.0°C. What amount of heat energy does it absorb?
13. What was the initial temperature of a 1.50 kg piece of copper that gains 2.47 x 104 J of energy when it is heated to a final temperature of 150°C?
14. A steel rod is at temperature of 25oC. To what Celsius temperature must your raise it in order to double it Kelvin temperature.
15. A certain metal has a specific heat capacity of 420 J/kg/OC, while water has a specific heat capacity of 4200 J/kg/oC. A kilogram of the metal and a kilogram of the water are both at a temperature of 98oC. If both are allowed to cool to 18oC, which will give off more heat to the atmosphere, and how much more will it release?
16. If 10.0 kg of water at 25oC is heated by a 100% efficient 1500 W heater for 5.00 min, what will its final temperature be?