Chapter 6 Worksheet

1. A 14.8 kg box is being dragged 12.5 m across the floor using a rope held at a 32.0º angle from the floor. The force being used is 146 N. **Determine** the work that has been done. *(1.55e3 J)*

2. **Describe** a situation in which you cause an object to move and yet no work was done. *(Carry a book across the room.)*

3. A piece of wood is burning on a fireplace. **Explain** whether or not work is done. *(Chemical energy in the wood is changed into thermal energy, so yes, work is being done.)*

4. You press down on the gas on your car and accelerate through the mob of zombies in front of you. As you move 65 m through the swarm to get out of the parkade of the shopping mall you've been hiding in, you estimate that the force of your car increases from 200 N to 780 N. **Determine** how much work your car did to the zombies. *(3.2e4 J)*

5. 3.54e2 J of work is done to speed up a 1.22e2 kg log rolling along the ground. If the log was originally moving at 2.3 m/s, **determine** how fast it ends up going. (3.3 m/s)

6. A person is standing at the top of a 58.0 m tall hill. He stumbles and falls. As he rolls down the hill, magically friction has no effect on him! When he is still 25.0 m above the base of the hill **determine** how fast he is moving. *(25.4m/s)*

7. It would seem to make sense to say that speeding up from 0 km/h to 30 km/h would take just as much energy as speeding up from 30 km/h to 60 km/h, since they both involve the same change in velocity, 30 km/h. **Determine** the change in energy for each change in velocity, assuming that you are dealing with a 2500 kg car. **Explain** why the values are different.

8. A stick of dynamite converts 1.68e5 J of chemical energy into kinetic and thermal energy in just 1.2e-2 s. **Determine** the power of this stick of dynamite. *(1.4e7 W)*

9. A garbage compactor is being designed that will use a 1.00 W motor to squish garbage. The garbage has a spring constant of 49.7 N/m.
   a) If I am going to squish it 30 cm, **determine** how much time the compactor takes. *(2.24 s)*
   b) Later I find out that the motor I am using in the previous question is only 35% efficient. **Determine** the actual output of the motor, and **explain** what this efficiency means. *(0.35 W)*