1. A 22.0 kg child slides down a ramp. At the bottom of the 5.00 m high ramp, the child has speed 2.50 m/s. Find the energy lost due to friction.

2. A 1000. kg car moving at 108. km/h jams on its brakes and comes to a stop.
   a) How much work was done by friction?
   b) If the car comes to stop in a distance of 64 m, what is the force of friction?

3. A 500. kg roller coaster is moving at 1.20 m/s at the top of a 30.0 m high hill. If 80. kJ is lost to heat, what will be the speed of the coaster at the bottom of the hill?

4. A 5.0 kg block sliding freely up a ramp. At the bottom of the ramp, the block has a velocity of 11 m/s. How high up the ramp does the block reach if 75 J is transformed to heat?

5. A child, starting from rest, slides down a 2.5 m high ramp. At the bottom of the ramp, the child has a speed of 4.0 m/s. If 580 J is lost to heat, determine the mass of the child.

6. Some years ago, a 80.0 kg paratrooper fell out of a plane at an altitude of 270. m and fell without a parachute to the ground below. When they landed, they made a 1.10 m deep crater in the snow but they survived! Assume that due to air resistance, they were moving at 50.0 m/s when they hit the ground.
   a) Find the work done by air friction during the fall
   b) Find the work done by the snow during the impact
   c) Find the average force from the snow

7. A toy car of mass 5.0 kg is pushed and given an initial speed of 6.0 m/s. If the friction force is 4.0 N, find how far the car goes before stopping.
   a) Solve using dynamics and kinematics
   b) Solve using energy

8. A 3.0 kg block has a speed of 5.0 m/s at the bottom of a ramp. The angle the ramp makes with the ground is 24°. If the block reaches a height of 0.60 m, determine the force of friction acting on the block.