Try to use the ideas of ENERGY to solve the following.

1. How much work must you do to lift a 25.0kg mass up 2.00m at constant speed?

2. How much gravitational potential energy will a 25.0kg mass gain if it is lifted 2.00m up?

3. If a 25.0kg mass is dropped from rest from a height of 2.00m, how much kinetic energy will it have as it lands?

4. Find the speed reached by a 25.0kg mass that fall 2.00m from rest.

5. Find the maximum height reached by a ball thrown upward at 9.0m/s.

6. A mass rolls from rest down a frictionless ramp from a height of 4.00m. Find the speed of the mass at the bottom of the ramp.

7. How much work must you do to lower a 25.0kg mass from a height of 2.00m to the ground at constant speed?

8. Find the total mechanical energy of a 138000kg jet flying at an altitude of 6.50**km** above the Earth at a speed of 148m/s.

9. A roller coaster rolls down a 12.0m high hill and then up a 5.00m hill. The speed of the roller coaster at the crest of the 12.0m high hill was 1.32m/s. Assuming no friction find the speed of the cart at the top of the 5.00m hill. **(make a drawing!)**

10. Consider the cart in question 9. Imagine that the cart loses 10.0% of its energy as heat created between the track and the wheels of the cart and as sound. What would be its speed at the top of the 5.00m high hill?

11. A small mass has 59J of kinetic energy and 167J of gravitational potential energy. The mass then falls, losing 94J of potential energy. During the process 14J of heat is produced (and lost to the surroundings). What is the final kinetic energy of the object?

12. A 175g ball is thrown straight upward at 12.0m/s. The ball reaches a maximum height of 6.40m. How much work was done to the ball by air resistance?

13. A 1500kg car accelerates up a hill. The car starts at rest and reaches a final speed of 72km/h, covering a distance of 160m. The hill is inclined at 11.0o. Find the net work done to the car.

14. A 1500kg car accelerates up a hill. The car starts at rest and reaches a final speed of 72km/h, covering a distance of 160m. The hill is inclined at 11.0o. Find the work done by gravity.

15. A 1500kg car accelerates up a hill. The car starts at rest and reaches a final speed of 72km/h, covering a distance of 160m. The hill is inclined at 11.0o. During the trip 240 000J of energy are lost through heat and sound. Find the work done by the car’s engine.