

Work and Energy Practice Problems

SL Physics

Name: _____

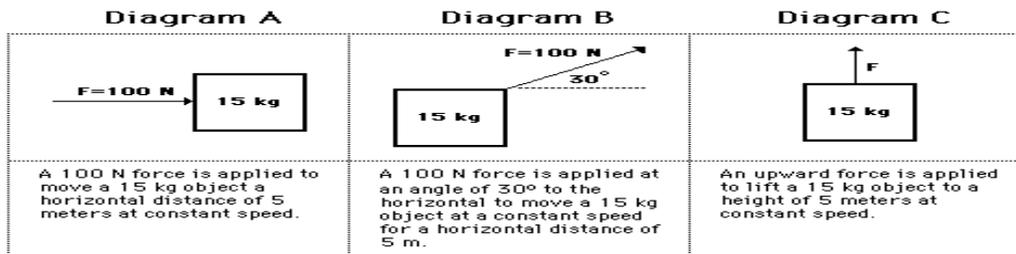
Date: _____ Period: _____

Complete these on a separate piece of paper. Show complete solutions.

1. For each of the following situations, determine whether work is being done in the scenario. Give a short explanation as to why.

- A teacher applies a force to a wall and becomes exhausted.
- A book falls off a table and free falls to the ground.
- A rocket accelerates through space.

2. For each diagram below, calculate the amount of work done solely by the force shown in the diagram. Show your work including the equation you are using.



3. In Diagrams A and B of Problem 2, a more complete free body diagram would show a friction force that must be present if the object is moving at a constant speed as stated. Calculate the Work done by the friction forces in each of those scenarios.

4. A student with a mass of 60.0 kg runs up three flights of stairs in 12.0 sec. The student has gone a vertical distance of 8.0 m. Determine the amount of work done by the student to elevate his body to this height. Assume that her speed is constant throughout

Kinetic Energy

5. Determine the kinetic energy of a runner jogging at 4.0 m/s. Assume she has a mass of 70.0 kg.

6. Missy Diwater, the former platform diver for the Ringling Brother's Circus, had a kinetic energy of 12,000 J just prior to hitting the bucket of water. If Missy's mass is 40.0 kg, then what was her speed just prior to landing?

7. Looking back at problem 5, what is the new kinetic energy of the runner if they double their speed?

8. The kinetic energy of an object moving at a constant speed is X. What is the new value of the kinetic energy (in terms of X) of the object if:

- the speed of the object is tripled?
- the speed of the object is cut in half?
- the speed of the object is doubled and the mass of the object is cut in half?

Potential Energy (just gravitational)

9. Eleanor lifts a Physics book (mass = 3.0 kg) two meters off the floor at a constant speed.

- By how much did the gravitational potential energy of the book change?
- How much work was done by Eleanor to accomplish this?

10. The roller coaster car pictured to the right has a mass of 1000.0 kg. Assume air resistance and friction are negligible.

- How much does the gravitational potential energy change when going from point 1 to point 2?
- How much work was done in going from point 1 to point 2?
- How much does the gravitational potential energy change when going from point 2 to 3?
- How much work was done in going from point 2 to point 3?

