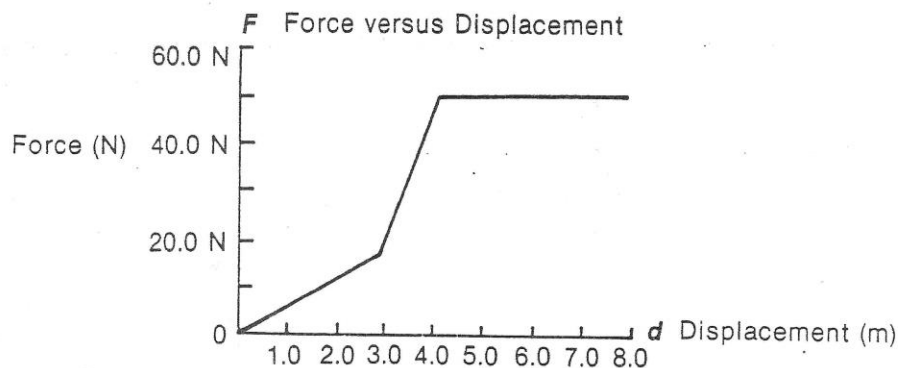Name _____ Period _____ Date_____

C. Using Concepts

1. An 80-N force pushes a 20-kg mass 10 m across a floor. Calculate the amount of work that is done.

2. A force of 300 N is used to push a 145-kg mass 30 m in 3 s.
   a. Calculate the work done on the mass.

   b. Calculate the power.

3. A 60-kg crate is slid up an inclined board 2 m long onto a platform 1 m above floor level. A 400-N force is needed to slide the crate up the board.
   a. How much work is done in sliding the crate up the board?

   b. How much work would be done if the crate were simply lifted straight up from the floor to the platform?

4. A 4200-N piano is to be slid up a 3.5-m plank that makes an angle of 30.0° with the horizontal. The plank is frictionless. Calculate the work done in sliding the piano up the plank.

5. A person pulls a 305-N sled along a snowy path using a rope that makes a 45.0° angle with the ground. The person pulls with a force of 42.3 N. The sled moves 16 m in 3.0 s. What is the power?

6. A car is driven at a steady speed of 21 m/s (72 km/h) down a road. The car's engine delivers 48 000 W of power. Calculate the average force of friction that is resisting the motion of the car.

7. Because there is very little friction, the lever is an extremely efficient simple machine. Using a 90.0% efficient lever, what input work is required to lift an 18.0 kg mass through a distance of 0.50 m ?

Name _____ Period _____ Date_____

D. Extending Concepts

1. **a.** From the graph below, calculate the work done to pull the object 7.0 m.
    b. Calculate the power if the work were done in two seconds.

F **Force versus Displacement**

Force (N)

60.0 N

40.0 N

20.0 N

0

1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0

d Displacement (m)

2. A 12.0 meter long conveyer belt, inclined at 30.0°, is used to transport bundles of newspapers from the mail room up to the cargo bay to be loaded on delivery trucks. Each newspaper has a mass of 1.00 kg and there are 25 newspapers per bundle. Determine the useful power of the conveyer if it delivers 15 bundles per minute.

3. The force of gravity, the force between unlike poles of a magnet, and the force between unlike point charges of electricity are all examples where the attractive force varies inversely as the distance of separation squared. The graph below illustrates the force-distance curve for the opposite poles of two strong magnets. Determine the work necessary to separate the magnets from a distance of 0.15 m to a distance of 0.4 m.

800.0 F

700.0

600.0

500.0

Force (N) 400.0

300.0

200.0

100.0

0

0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00

d

Displacement (m)