ACTIVITY ■ Work, Power, and Simple Machines

Calculating Work and Power

Solve the following problems. Show all your work. Remember to include the correct units.

1. How much work is done by a crane that lowers 1000 N of material a distance of 150 m?

2. How much work is done when a 1-kg mass is raised a vertical distance of 1 m?

3. A 5-kg rock is lifted 2 m in 5 sec.
   a. How much work is done?

   b. What power is used?

4. A teacher pushed a 10-kg desk across a floor for a distance of 5 m. She exerted a horizontal force of 20 N. How much work was done?

5. A weight lifter lifts a 150-kg barbell above his head from the floor to a height of 2 m. He holds the barbell there for 5 sec. How much work does he do during that 5-sec interval?

6. A student who weighs 500 N climbed the stairs from the first floor to the third floor, 15 m above, in 20 sec.

   a. How much work did she do?

   b. What was her power?

7. A box is pushed across the floor for a distance of 5 m with a force of 50 N in 5 sec.

   a. How much work is done?

   b. What is the power?

   c. If the box is pushed back again, what is the total amount of work done?

8. A woman lifts a 35-kg child a distance of 1.5 m and carries her forward for 6.5 m.

   a. How much work does the woman do in lifting the child?

   b. How much work does the child do?

9. If 4000 N are used to raise a 30-kg mass, how high is the mass raised?

10. A force used to lift a 12-kg mass to a height of 8 m in 2 sec does 1040 J of work.

   a. How much force is used?

   b. What power is developed?