1. You pull your sled through the snow a distance of 500 m with a horizontal force of 200 N. How much work did you do?

$$\omega = f \cdot d \cdot (500m)(200N) = 100,000 \text{ J}$$

2. You did 150. J of work lifting a 120.-N backpack. How high did you lift the backpack?

$$d = \frac{\omega}{f} = \frac{150. \text{J}}{120. \text{N}} = 1.25 \text{ m}$$

3. A crane does 625 J of work to lift a boulder a distance of 25.0 m. How much did the boulder weigh? (Hint: The weight of an object is considered to be a force in units of newtons.)

$$F = \frac{\omega}{d} = \frac{625 \text{J}}{25.0 \text{m}} = 25.0 \text{ N}.$$

4. A bulldozer does 30,000. J of work to push another boulder a distance of 20. m. How much force is applied to push the boulder?

$$F = \frac{\omega}{d} = \frac{30,000. \text{J}}{20. \text{m}} = 1500 \text{ N}$$

5. A 450.-N gymnast jumps upward a distance of 0.50 m to reach the uneven parallel bars. How much work did she do?

$$\omega = f \cdot d = 450. \text{N} \cdot 0.50m = 230 \text{ J}$$

6. How much work does a mother do if she lifts each of her twin babies upward 1.0 m? Each baby weighs 90. N.

$$\omega = f \cdot d = (180N)(1.0m) = 180 \text{ J}$$

7. It took a 500.-N ballerina a force ~~work~~ of 250 J to lift herself upward through the air. How high did she jump?

$$d = \frac{w}{f} = \frac{250 J}{500. N} = 0.50 \text{ m}$$

8. A book weighing 10. N is lifted 2 m. How much work was done?

$$w = f \cdot d = (10. N)(2m) = \underline{20 J}.$$

9. A force of 15 N is used to push a box along the floor a distance of 3 meters. How much work was done?

$$w = f \cdot d = (15 N)(3m) = \underline{50 J}$$

10. It took 50 J to push a chair 5 meters across the floor. With what force was the chair pushed?

$$F = \frac{w}{d} = \frac{50 J}{5 m} = \underline{10 N}$$

11. A force of 100 N was necessary to lift a rock. A total of 150 J of work was done. How far was the rock lifted?

$$d = \frac{w}{F} = \frac{150 J}{100 N} = 2 \text{ m}$$

12. A young man exerted a force of 9,000 N on a stalled car but was unable to move it. How much work was done?

No work!