Date ___/___ Block:

Power

1. A 60 kg box is lifted by a rope a distance of 10 meters straight up at constant speed. How much power is required to complete this task in 5 seconds?

2. Hulky and Bulky are two workers being considered for a job at the UPS loading dock. Hulky boasts that he can lift a 100 kg box 2.0 meters vertically, in 3.0 seconds. Bulky counters with his claim of lifting a 200 kg box 5.0 meters vertically, in 20 seconds. Which worker has a greater power rating?

- 3. A 1994 Ford Mustang is driving down a road with a constant speed of 30 m/s. The engine must exert a 5000 N force to maintain this speed.
 - a. What is the power rating of the engine?

b. How does the Mustang's power rating compare to the 220 hp Dodge Stealth engine (1 hp = 746 W)?

- 4. An 82 kg hiker climbs Mt. Humphrey near Flagstaff, AZ. During a two-hour period, the hiker's vertical elevation increases by 540 meters.
 - a. Calculate the climber's ΔU_g .
 - b. Find the power generated to increase the hiker's Ug.

5. How long would it take a 7.5 KW motor to raise a 500 kg piano to an apartment window 10 meters above the ground?

6. The trains on a roller coaster are raised from 10 m above ground at the loading platform to a height of 60 m at the top of the first hill in 45 s. Assume that the train (including passengers) has a mass of 2500 kg. Ignoring frictional losses, what power motor would be required to accomplish this task?

- 7. Your electric utility company sends you a monthly bill informing you of the number of kilowatt•hours you have used that month.
 - a. Is the utility charging you for energy or power? Explain.
 - b. How many joules does your 1600W blow drier transfer if you dry your hair in 5.0 min?