

A weather balloon with a mass of 125 kg falls 9,000 m to the ground. How much work does gravity do on the balloon?

How much power does a
bicycle being propelled
forward with a force of 780
N at a speed of 25 m/s
have?

You discover an old locked box in the floor of a barn. Unfortunately, it's buried underneath a pile of rubble. You decide to use a plank as a lever. The end of the lever rests just beneath the edge of the rubble and extends 0.6 m to a paint can that you're using as a fulcrum. The *total* length of the plank, from the end under the rubble to where the force is applied, is 3.0 m. What mechanical advantage do you expect to get from your lever?

An engineer designs a ramp. She wants to determine the mechanical advantage, but the only tool she has to measure force measures kilograms. If the average person has a mass of 75 kg and force applied to travel the length of the ramp (measured in kg) is 5 kg, what is the ramp's mechanical advantage?

A new machine is produced to assemble TI-83 graphing calculators. The machine's makers claim the machine has an efficiency rating of 96 %. If the machine requires 4500 N of force across a distance of 0.15 m, how much work must come out for it to be as efficient as claimed?

A student performs 620 J of work lifting his little cousin to a height of 1.8 m. What is the mass of the student's cousin?

The power generated from a football player pushing a tire across the field during practice is 367 Watts. If the player uses 550 J of force across the 100-m distance, how many minutes did it take him to push the tire from one end of the field to the other?

A screw has an ideal mechanical advantage of 5. If the height of the screw is 3.5 cm, how many millimeters measure the length of the thread wrapped around the screw?

A pulley is used to lift the cart that a couple of painters stand in to paint the side of a building. If the mechanical advantage of the pulley is 14, and the mass of the cart, two painters and all their equipment is 180 kg, what is the effort force that the painters applied to raise themselves?

The efficiency rating on a new paddle boat at Pullen Park is 89 %.

If the force of the paddle on the water is 220 N over a distance of 1.6 m, and the average couple inputs 68 N onto the pedals, what is the length of each “pedaling?”

A new machine designed to push people in wheelchairs across the airport does 187 kJ of work pushing a man in his chair with a force of 585 N. How far did the machine push the man?

A cheerleader lifts his partner above his head 3.1 m in 1.1 seconds. He produces 1436 Watts of power performing this action. What is the mass of his partner?

The ideal mechanical advantage of an inclined plane that is part of a new roller coaster ride is 9. If the length of the track is 340 m, how many km is the height of the ride?

An elevator uses a pulley system with a mechanical advantage of 7 to lift its passengers. If the force applied to raise the car and passengers is 1190 N, what is their mass?