

Name: _____

Efficiency of Simple Machines

Directions: Fill in the blanks. Use your text to help you.

Throughout human history, people have tried to invent a machine that could run forever.

This type of machine is called a (a) _____ but is impossible to build because some of the energy put into the machine is transformed into other forms of energy, such as (b) _____, which the machine cannot use.

The efficiency of a machine is a measure of the (c) _____ done by the machine compared to the (d) _____ required to operate it. The work the machine is designed to perform is called the (e) _____. A bicycle's useful output work is its (f) _____, whereas the work done moving the pedals is the (g) _____.

All machines experience the force of friction. Work done by friction transforms the input energy into (h) _____. Since extra work must be input to compensate for the work done by friction, the useful output work is always (i) _____ the input work. The more efficient a machine is, the less friction it has.

You can increase the efficiency of many machines by using a (j) _____, which allows surfaces that (k) _____ together to move past each other easily. (l) _____ is an example of a good lubricant.

Unfortunately, no machine completely eliminates friction; therefore, no machine is (m) _____ efficient. Efficiency can be calculated by dividing the useful output work by the input work, then multiplying by (n) _____. If you put 240 J of work into a machine and it does 90 J of work, the efficiency of the machine is (o) _____ %.

A ramp is a simple machine that allows a small force to be applied through a large distance. The input work for a ramp is calculated by multiplying the force applied by the (p) _____ of the ramp. The useful output work is determined by the weight of the object pushed up the ramp multiplied by the (q) _____ of the ramp. If the force of 200 N is required to push a 500-N crate 10 m along a ramp to a vertical height of 3 m, the efficiency is (r) _____ %.

Many machines are quite inefficient. A conventional gas-powered car is (s) _____ % efficient, but an (t) _____ is twice as efficient. A (u) _____, which converts sunlight into electricity, is only (v) _____ % efficient.

Incandescent light bulbs are only (w) _____ % efficient because most of the electrical energy is transformed into (x) _____. Compact fluorescent light bulbs are much more efficient because they operate at a (y) _____ temperature.